



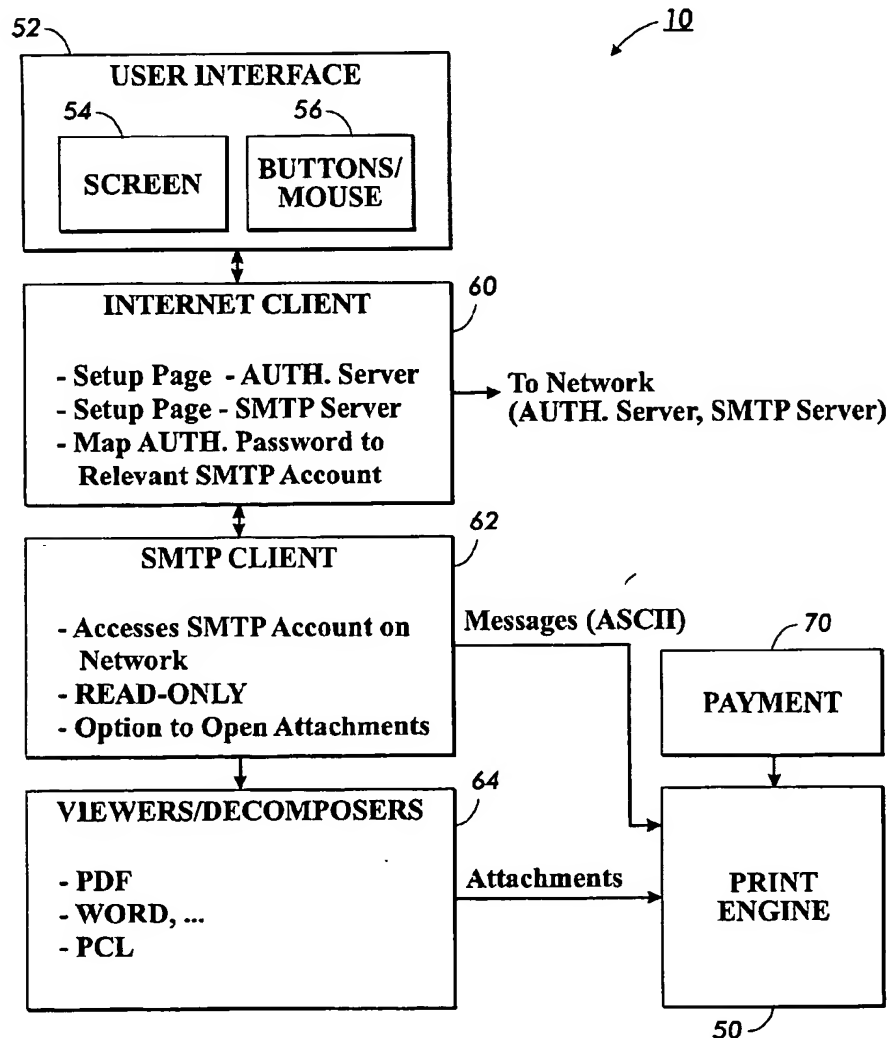
US 20020075506A1

(19) **United States**(12) **Patent Application Publication**
Stevenson et al.(10) **Pub. No.: US 2002/0075506 A1**(43) **Pub. Date: Jun. 20, 2002**(54) **REMOTE PRINTING OF ELECTRONIC MAIL****Publication Classification**(51) **Int. Cl.⁷** G06F 15/00; B41F 1/00(52) **U.S. Cl.** 358/1.15; 358/1.14(75) **Inventors:** Duncan I. Stevenson, Smallford (GB);
Michael J. Lovibond, Kimpton (GB);
Garry Blackmore, Stevenage (GB)**Correspondence Address:****John E. Beck****Xerox Corporation****Xerox Square 20A****Rochester, NY 14644 (US)**(73) **Assignee:** Xerox Corporation(21) **Appl. No.:** 09/738,924(22) **Filed:** Dec. 15, 2000

(57)

ABSTRACT

A digital printer which resides on a network is, by itself, capable of accessing an electronic mail account which exists in an SMTP server on the same network. The user interface of the printer can be used to enter a network password and view headings of messages in the account associated with the network password. The user can then request the text or attachments of certain messages to be output at the printer. The system allows any user who has access to the network to retrieve electronic mail without a personal computer.



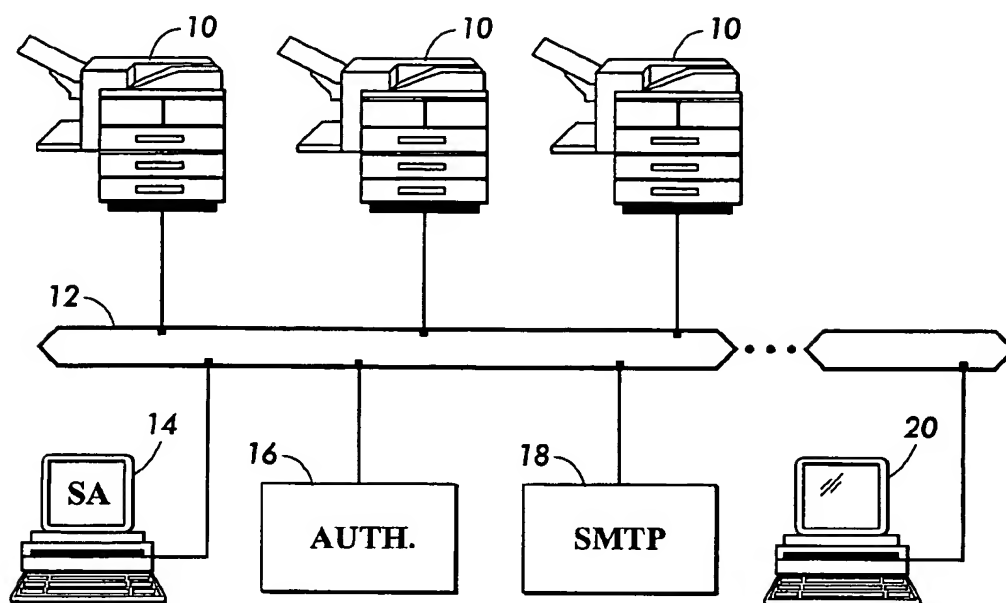


FIG. 1

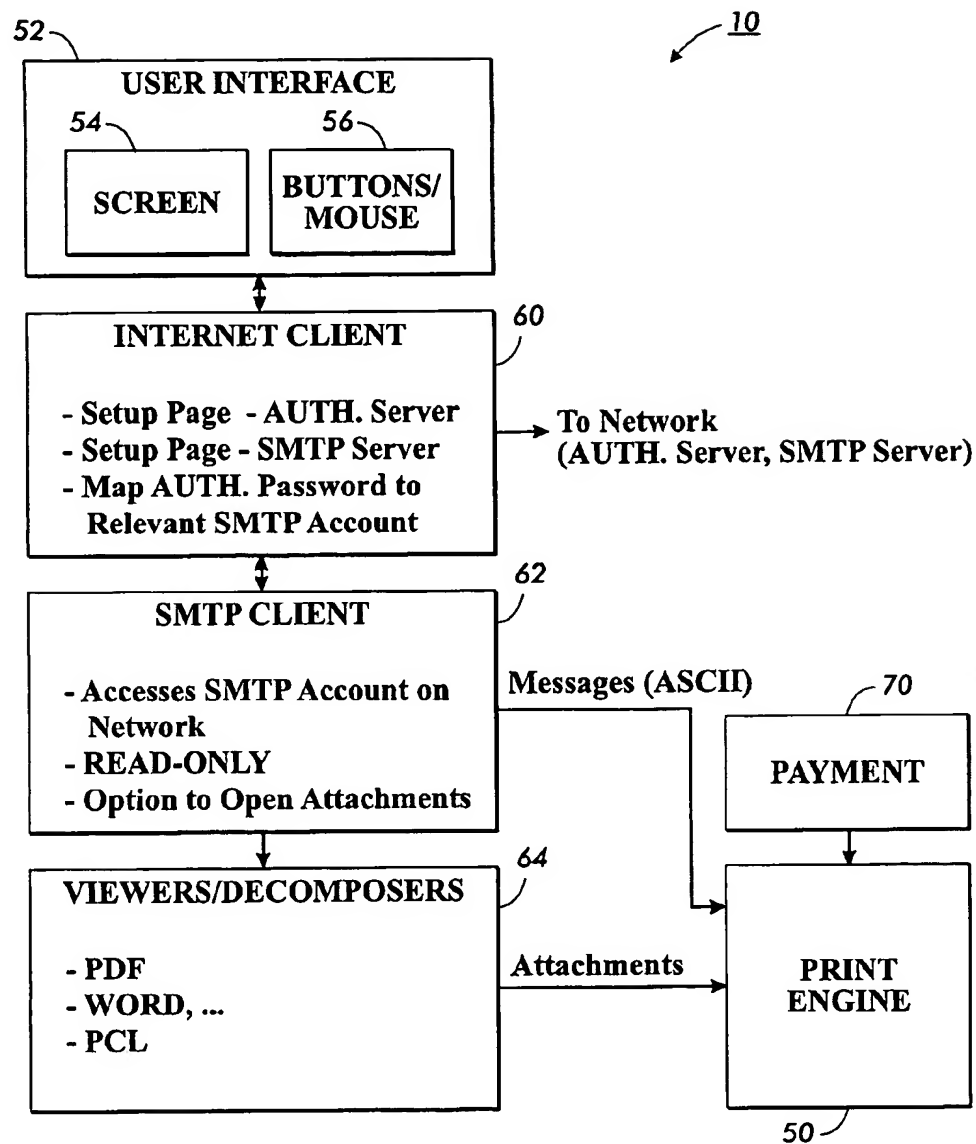


FIG. 2

REMOTE PRINTING OF ELECTRONIC MAIL

FIELD OF THE INVENTION

[0001] The present invention relates to digital printing apparatus, particularly those which exist on a network having electronic mail (e-mail) capability.

BACKGROUND OF THE INVENTION

[0002] Digital printing apparatus, devices which receive digital image data and output hard copy sheets based on the digital image data, are well known. It is also familiar to locate such printers on a network, so that one or more printers can receive image data from any number of computers on the network for printing. The computers, or other image sources such as scanners, can convey data representative of images desired to be printed over the network, using familiar techniques such as Ethernet, Internet, or other protocols.

[0003] Since digital printers exist on a network which is shared with any number of personal computers or other devices, the digital printers form an integral part of a corporate wide network which can exist among several offices, and indeed among several countries or continents. It is conceivable, for instance, to send a print job from a computer in the United States to a printer in England; if the computer and printer are part of a single corporate entity organized with a single corporate authentication server, the transaction is indistinguishable from sending the print job from one side of a room to the other. Typically, after an initial authentication of the computer, an authentication server controlling the entire network will simply allow transparent access to any other device on the network, including a printer which may be located in another country.

[0004] The present invention relates to a system whereby software which is hosted on a particular printer enables remote access to electronic mail accounts by any authenticated person recognized by the network, so that the person's electronic mail messages may be printed out at the printer without, for instance, the use of a personal computer.

DESCRIPTION OF THE PRIOR ART

[0005] U.S. Pat. No. 5,760,917 discloses a distribution system for transmission of digital images. There is provided a hub station and terminals remote from the hub station. Each terminal includes means for selecting access rights to a remotely stored image set.

[0006] U.S. Pat. No. 6,078,406 discloses a system for controlling transmission of information relating to print jobs. Data relating to a print job is sent to a printer. Information relating to the confirmation or failure of the print job can be sent to any number of confirmation destinations via electronic mail.

[0007] U.S. Pat. No. 6,108,099 discloses a printer having a network interface for connecting the printer to network as a network terminal, and an electronic mail communication control unit for communicating with another network terminal. Abnormal conditions which are sensed within the printer result in specialized electronic mail communications to a particular address.

SUMMARY OF THE INVENTION

[0008] According to the present invention, there is provided a digital printing apparatus, comprising a print engine,

for outputting prints in response to printer-formatted digital data submitted thereto, and an electronic mail client. Access means cause the electronic mail client to access an electronic mail account in an electronic mail server, and transfer data derived from at least one electronic mail message stored in the electronic mail account to the print engine.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] FIG. 1 is a diagram showing a plurality of digital printers operatively disposed on a network, illustrating a context of the present invention.

[0010] FIG. 2 is a diagram showing the elements of a digital printer suitable for carrying out the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0011] FIG. 1 is a diagram showing the configuration of a plurality of digital printers, each of which is indicated as 10, operatively disposed on a network, such as indicated as 12. The network 12 is of a type familiar for applications in both transmission of print jobs and electronic mail, and such networks are common in any number of business organizations. Typically disposed on such a network is a computer relating to a systems administrator (SA), and such computer is indicated in FIG. 1 as 14; there will also be disposed on network 12 what is called an "authentication server" 16 as well as an electronic mail or SMTP server 18. In addition, there will typically be provided on the network 12 any number of a personal computers or their equivalents, one of which is indicated as 20. In a common configuration of such networks in business organizations, these computers such as 20 can exist in several rooms, several buildings, or across countries.

[0012] The function of the authentication server 16, which is typically controlled via the systems administrator computer 14, is to "authenticate" individual users, each of which is in control of a particular computer 20. Typically, a user who has logged onto one computer 20 can submit a network password to the authentication server 16, and if the password is correct, the person on computer 20 will thus be granted access, through authentication server 16, to other devices on network 12. Among these other devices on network 12 is the SMTP server 18, which, as is well known, typically serves as a common repository for the electronic mail accounts of all persons on the network.

[0013] With reference to the individual printing devices on network 12, which are each indicated as 10, each of these printers includes at least a print engine, meaning a xerographic, ink-jet, or equivalent device, by which digital data representative of images desired to be printed are caused to create marks on sheets which are output by each printer 10. Further, each printer 10 can in fact be a multifunction device, such as including an input scanner so as to function as a digital copier; further functions such as facsimile and scan-to-file are common in such machines as well.

[0014] With particular reference to the present invention, there is provided, within each printing apparatus 10, hardware and software which enables the printer itself to act as a device on network 12 which is capable of accessing other sources of data on a network, in particular, electronic mail accounts within one or more SMTP servers 18 on the

16

network. In other words, according to the present invention, a person desiring to access his own electronic mail account on a server 18 would be able to walk up to a printer 10 which has been specially equipped according to the present invention, and, using the printer alone and without an additional personal computer, access the electronic mail messages in his account.

[0015] The practical advantage of the present invention is as follows. If a person working for a particular company is traveling to various locations within the company, and is away from his own personal computer such as 20, that person can go to any printer or digital copier which is on the corporate network, and, simply by entering his standard network password, remotely access and print out his electronic mail. The same concept could apply to a printer or digital copier in a semi-public context, such as in a university library, wherein, in addition to walkup use of the digital copier, registered users such as students can use the copier to retrieve their electronic mail on a university-sponsored server, perhaps printing out attachments therein after submitting a fee, either with currency or a debit card.

[0016] FIG. 2 is a simplified diagram showing the essential elements, which are embodied in a software and hardware, which must be incorporated within a particular printer 10 in order for the printer to carry out the essential functions of the present invention. In the below description, each of the elements are known in the prior art, or could be readily adapted using well-known principles of Internet communication.

[0017] As mentioned above, an essential attribute of any printing apparatus 10 is a print engine, which may be of any type familiar in the art, such as an ink jet engine or a xerographic "laser" engine. Ancillary to the basic hardware is software which formats, buffers, and otherwise processes image data for submission to the hardware. The print engine, along with any associated software, is generally indicated in the Figure as 50.

[0018] Another element of a printer 10 which is important to the present invention is what can be called a "user interface" 52. User interfaces, which typically comprise a touch screen, lighted display, or similar device, are generally familiar in the art of copiers and printers. With particular reference to the present invention, there should be at least two essential attributes of the user interface 52, which are shown separately in the Figure for clarity: there should be a display screen 54, by which information is displayed to a user, as well as some manually operable device, such as indicated as buttons 56. It will be noted that the functions of the display screen 54 and buttons 56 may, in a practical embodiment, be combined in a single structure, such as a touch-sensitive screen, and can include more sophisticated devices, such as a mouse, joystick, or QWERTY keyboard, depending on the relative sophistication and cost of the printer 10. What is important is that a certain quantity of information be readily displayed to the human user, and that the human user can in turn implement his desired instructions for the user interface easily and accurately. As is well known, the user interface generally indicated as 52 includes not only the display and button hardware but ancillary software as well: indeed, in one typical implementation of the user interface, the user interface 52 itself includes a dedicated microprocessor. In a preferred embodiment of the

present invention, user interface 52 is the same user interface (i.e., the same display screen) as is used for general functions of printer 10, such as for selecting finishing, paper supply, and other options, particularly if printer 10 is a digital copier: in the language of the claims, the user interface 52 can be used both for the basic purposes of the invention and also for "selecting printer related options."

[0019] Besides the print engine 50 and the user interface 52, along with any other functions which are native to the basic printing apparatus 10, there are further special elements which enable the present invention. Foremost among these elements are an Internet client 60, and an SMTP client 62. In general, these "clients" are software entities which run on a one or more microprocessors within printer 10: in general, such clients are commercially available, and indeed, for present purposes, may exist as "defeatured" versions of commercially available products. Significantly, these elements such as 60 or 62 are "hosted" by the basic hardware of the printer 10: they run on processors which are integrated with the overall control system of printer 10.

[0020] First, with regard to Internet client 60, there are essentially two modifications which must be made to the basic client in order for it to operate according to the present invention: there must be set up on client 60 a page referencing the Internet address of the authentication server 16 (as shown in FIG. 1), as well as another page referencing the Internet address of one or more SMTP servers 18 which would be required to be referenced by a human user likely to be using a particular printer 10. In other words, with the set up pages, the Internet client 60 is loaded with the information about where the relevant authentication server 16 and SMTP server 18 reside. With regard to SMTP client 62, the essential function of this client is to access an authorized account in the SMTP server 18 out on the network, and then to view, preferably in a "read-only" fashion, message headings and text from electronic mail messages in that account. As such, the SMTP client 62 may simply be a defeatured, read-only version of any number of commercial electronic mail clients, such as Microsoft® Outlook™. The client 62 should be capable of, for example, discriminating between open and unopened mail in an electronic mail inbox, as well as indicating whether an attachment to the particular electronic mail message exists, and making available an option to access and open such attachments. Once again, all these basic capabilities are available through commercial electronic mail programs, and indeed, the client 62 required to carry out this invention can probably be a rudimentary version of such a commercial program.

[0021] Having discussed the basic elements of a digital printing apparatus which facilitates the present invention, a preferred method of operation of the present invention is as follows. A user having some relationship to a corporate-wide network, such as by being an employee, may wish to access his electronic mail messages, which are located in an SMTP server 18 somewhere on the network. However, if the user is not disposed near his customary personal computer, he can nonetheless go to a printing apparatus such as printer 10 which is on the network, in order to access his messages. For this purpose, according to the present invention, there should be, in user interface 52, provision for the user to select a mode of operation such as "retrieve electronic mail." Once this option has been selected, such as through a touch screen,

the user is asked to identify himself by name or other identifier, and then to enter his network password, which would preferably be the same network password the user would use when logging on to his personal computer 20. As a practical matter, if the user is one of thousands of people sharing a network within a large corporation, it may be desirable to have the user enter this information through a standard QWERTY keyboard which is associated with the digital printing apparatus (such a keypad may be embodied on a touchscreen). After he has been identified, the user enters a password, such as on the QWERTY keypad. Practical variations on the above described methods of entering personal information into a printing apparatus will be appreciated.

[0022] According to a preferred embodiment of the present invention a single network login will be required to gain access to the e-mail service. When the user enters his name, and then enters his standard network password, the Internet client 60 within printer 10 can simultaneously obtain authorization from authentication server 16, which grants the user access to the network in general, and also to the SMTP server 18, which will provide the particular user with access to his electronic mail account, without the user having to enter a separate password for electronic mail. In this way, the network login procedures and password for a user logging into the network simultaneously map into an electronic mail account accessible to the user.

[0023] Once communication is established between a particular printing apparatus 10 and the SMTP server 18, the SMTP client 62 within the printer 10 can then view the contents of the user's electronic mail account, exactly in the manner of a commercial e-mail program. Such commercial programs would be capable of distinguishing between opened and unopened messages. Thus, from the perspective of the user interface 52, the user standing at the particular printer can be offered the option of viewing or printing all of his electronic mail messages, or only those which are unopened; this option can be presented to the user as a simple pair of buttons, such as on a touch screen. Another possible standard for choosing what messages to view or print is to allow the user to select viewing or printing of only those messages in which the user is one of small number of recipients; this would exclude messages sent to large distribution lists.

[0024] Once the user selects what type of messages he would like to view, the electronic mail client 62 within printer 10 can then view the requested messages in the particular account. The text of the messages is, according to the present invention, sent directly to the print engine 50. Typically, the basic text of the electronic mail messages will be in a simple ASCII text format, and such text formats are easily fed to the print engine 50 for printing. Thus, once the user selects the messages in his account he wishes to view, the ASCII data forming the messages can be fed readily to the print engine 50 with only minimal formatting. Typically, it is probably most desirable to simply print each message on successive sheets of paper (one message per page or otherwise) which are output by the print engine 50.

[0025] Another possibility is to have only the headings (sender, subject, etc.) for the desired messages appear on the screen 54 of the user interface 52, so that the user can view the headings and then select, such as through buttons 56,

specific messages in his inbox which he would like to print out with the printer 10. Typically, for cost reasons, the screen 54 in a printer 10 is small, so that displaying an entire e-mail message through screen 54 is probably not practical.

[0026] It is common, in commercial contexts of electronic mail, that certain messages will include attachments which link to longer communications, such as long prose documents or spreadsheets. Typically, these attachments within an electronic mail must link to another location in the basic electronic mail memory or a separate memory. A facility for opening attachments is common in many commercial electronic mail applications. With the present invention, such attachments can be viewed using, for example, a viewer for such attachments such as shown at 64 in FIG. 2. These viewers can be resident within a particular printer 10, or at the printer can can remotely access the viewer from another source. Such viewers which would be useful in this context include Microsoft® Word™, Microsoft® Excel™, WordPerfect®, and so forth; and can also include decomposers for printing, such as Adobe® Acrobat™ or PCL (indeed, such decomposers are standard in most digital printers). For purposes of the present invention, the definition of a viewer is whatever software is necessary to make an attachment residing in an electronic mail memory printable by the print engine 50.

[0027] In a practical embodiment of a printing apparatus which is capable of remotely viewing and printing out attachments in electronic mail, it is probably most useful to display to the user the headings of various messages through screen 54, and, along with the display of the sender and subject heading, provide some symbolic indication of whether an attachment is provided with the message: once again, this capability of showing the presence of an attachment is present in, for example, Microsoft® Outlook™. When the headings are displayed on screen 54, there can further be displayed some other indication available to the human user that he may select to print out that particular attachment. If the user uses buttons 56 or equivalent to indicate that a message displayed on screen 54 should have its attachment printed, then the attachment can be viewed from the SMTP server 18, the attachment data sent through the suitable viewer or decomposer 64, and printed through print engine 50.

[0028] Another conceivable technique for facilitating selection of what attachments in an electronic mail account to be printed out can include deriving and printing bar codes or their equivalent on the printout of the basic electronic mail messages, allowing a user to indicate, such as with a check mark on the actual printed sheet, what attachments he would like to print out. Then the user can feed the marked printout through an input scanner, such as on a digital copier, and special software within the digital copier could interpret the bar codes and marks as instructions to print out a particular attachment. Such a functionality could be adapted from existing commercial input scanning products, such as Xerox® FlowPort®.

[0029] In a commercial or library context of a printer such as 10, it may be desirable to include a payment device, such as indicated in FIG. 2 as 70, associated with the print engine 50. Thus, in for instance a university library context, a registered student recognized by the network will be able to access his own electronic mail account via a printer 10 in the

attachment

library, but would have to pay a per-page fee for printing of any output (either the basic electronic mail messages, or a particular attachment thereto) at the library's printer. Such a payment device 70 could accept currency or other payment means, such as a debit card. The basic technology for such a payment device associated with a print engine is known.

[0030] Although the authentication server 16 and SMTP server 18 are each shown in FIG. 1 as an independent computer residing on a network 12, and indeed are preferred to be such as of the filing hereof, it is conceivable that any of these servers could be combined in a single computer, or could be hosted by a processor within a printer 10 on the network: in other words, if a particular printer 10 is "always on" in the manner of a server (as is often the case with high-volume printers), it may be desirable to use the processor in the printer as a server for any of the above functions.

1. A digital printing apparatus, comprising:
 - a print engine, for outputting prints in response to printer-formatted digital data submitted thereto;
 - an electronic mail client; and
 - access means for causing the electronic mail client to access an electronic mail account in an electronic mail server, and transfer data derived from at least one electronic mail message stored in the electronic mail account to the print engine.
2. The apparatus of claim 1, the access means including a client which is hosted by a processor within the digital printing apparatus.

3. The apparatus of claim 1, further comprising a viewer for submitting an attachment associated with the electronic mail message to the print engine as printer-formatted digital data.

4. The apparatus of claim 1, further comprising authentication means for authenticating the electronic mail client relative to the electronic mail server of interest.

5. The apparatus of claim 4, further comprising means for mapping a user's network password to an electronic mail account accessible to the user.

6. The apparatus of claim 1, further comprising a user interface for displaying headings of electronic mail messages in the electronic mail account.

7. The apparatus of claim 6, the user interface being further usable for selecting printer-related functions.

8. The apparatus of claim 1, further comprising a user interface including means for allowing a user to select a displayed electronic mail message for printing.

9. The apparatus of claim 1, further comprising a user interface including means for allowing a user to select printing an attachment associated with a message in the electronic mail account.

10. The apparatus of claim 1, further comprising a payment device for accepting payment for the print engine printing the electronic mail message.

11. The apparatus of claim 1, further comprising a payment device for accepting payment for the print engine printing an attachment associated with an electronic mail message.

* * * * *



US006577907B1

(12) **United States Patent**
Czyszczewski et al.

(10) Patent No.: **US 6,577,907 B1**
(45) Date of Patent: **Jun. 10, 2003**

(54) **FULLY MODULAR MULTIFUNCTION DEVICE**

5,764,866 A * 6/1998 Maniwa 358/1.15
5,859,935 A 1/1999 Johnson et al. 382/317
6,021,448 A * 2/2000 Kim 358/468

(75) Inventors: Joseph Stanley Czyszczewski,
Longmont, CO (US); James T Smith,
II, Boulder, CO (US); Ivan Woehr,
Superior, CO (US); Luana L. Vigil,
Longmont, CO (US); David George
Greenwood, Lafayette, CO (US)

FOREIGN PATENT DOCUMENTS

JP 08331362 A 12/1996 H04N/1/387
JP 09037004 A 2/1997 H04N/1/00
JP 9-077365 3/1997

* cited by examiner

(73) Assignee: International Business Machines
Corporation, Armonk, NY (US)

Primary Examiner—Ramesh Patel
(74) Attorney, Agent, or Firm—Carlos Munoz-Bustamante;
Ohlandt, Greeley, Rugeiero & Perle, LLP

(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 0 days.

(57) ABSTRACT

A multifunction device includes a multifunction controller, a first interface for receiving input data from at least one scanner and a second interface for outputting processed input data to at least one printer, wherein the first interface and the second interface are each a standard interface. In a presently preferred embodiment the first interface is comprised of a SCSI interface. The multifunction device further includes a graphical user interface for controlling the operation of the multifunction device, including setting operational parameters for the at least one scanner and the at least one printer. Other interfaces are also provided, including one for coupling to a facsimile device for outputting processed input data to the facsimile device, and another interface for coupling to an e-mail port for outputting processed input data to the e-mail port. Another interface is for coupling to a global data communications network, such as the Internet, for receiving document data as well as recipient contact information therefrom.

(21) Appl. No.: 09/556,554

(22) Filed: Apr. 24, 2000

(51) Int. Cl.⁷ G05B 11/01

(52) U.S. Cl. 700/17; 700/83; 700/19;
700/20; 358/442; 358/444; 358/468

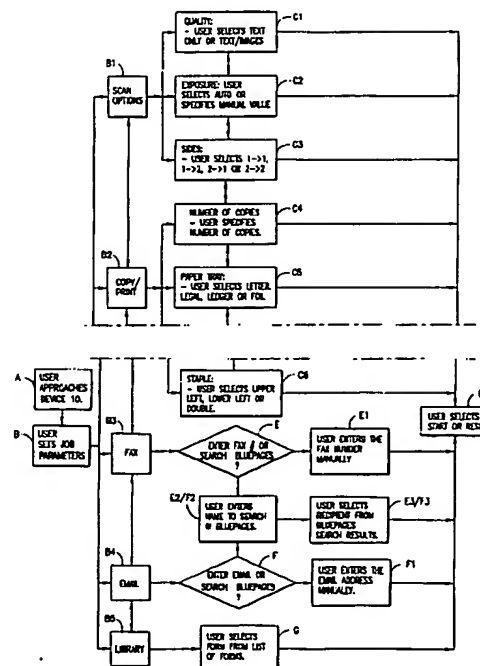
(58) Field of Search 358/442, 444,
358/468, 404; 700/19, 20, 35, 17, 83; 345/650,
651, 652, 661, 662, 663

(56) References Cited

U.S. PATENT DOCUMENTS

4,454,575 A 6/1984 Bushaw et al. 364/200
5,361,134 A * 11/1994 Hu et al. 358/296
5,438,433 A 8/1995 Reifman et al. 358/468
5,530,907 A 6/1996 Pavay et al. 395/889
5,754,308 A 5/1998 Lopresti et al. 358/403

27 Claims, 15 Drawing Sheets



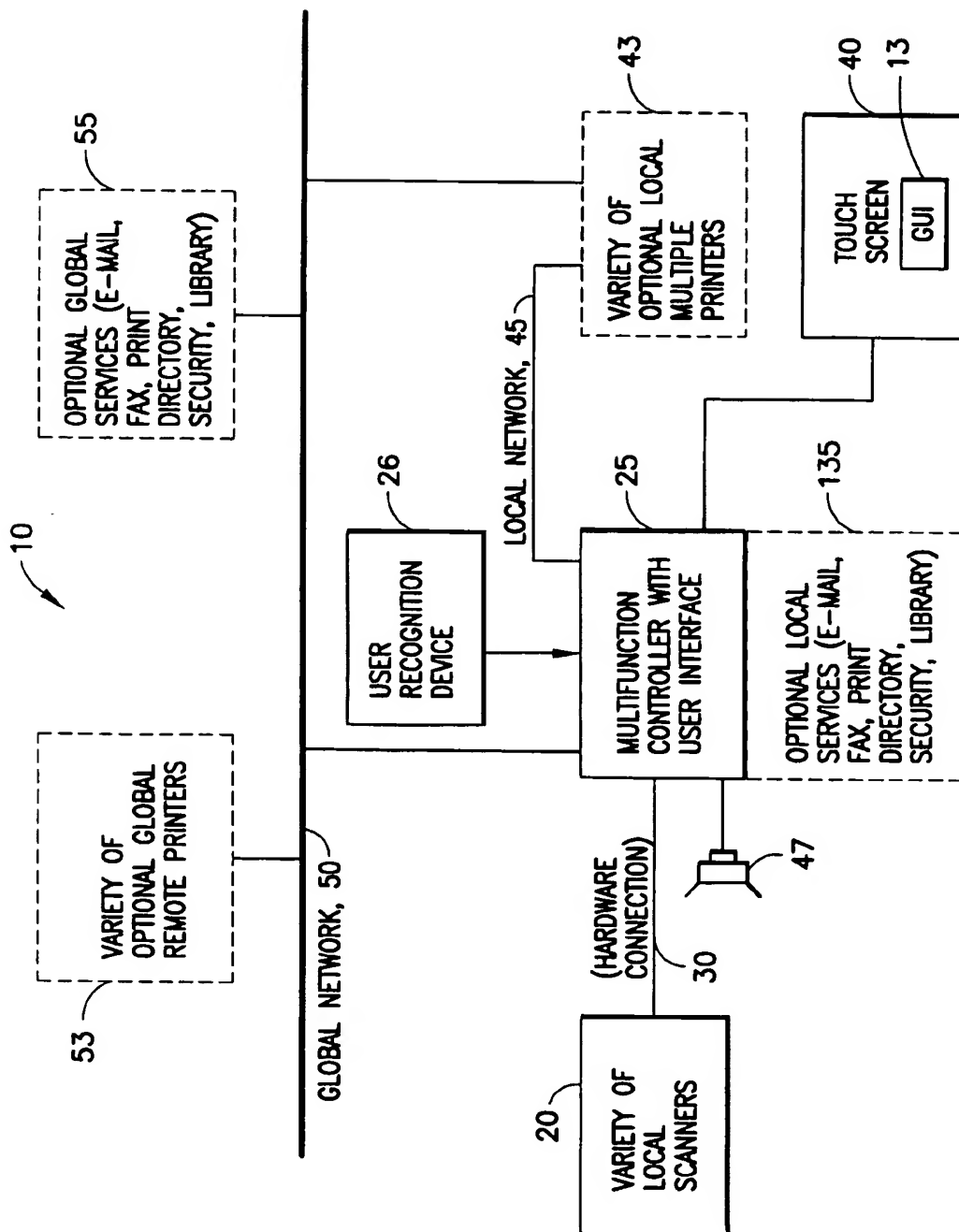


FIG. 1

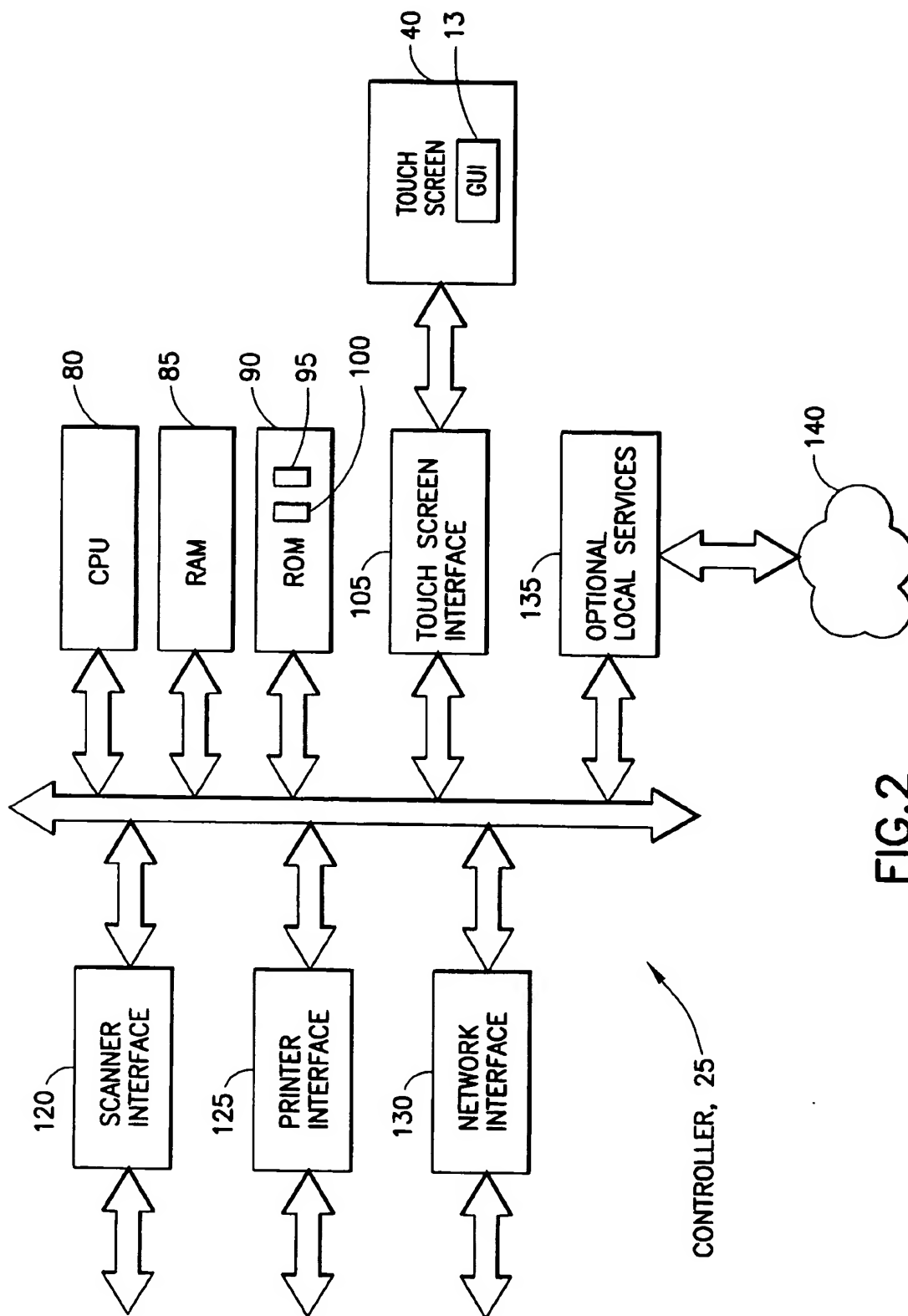


FIG. 2

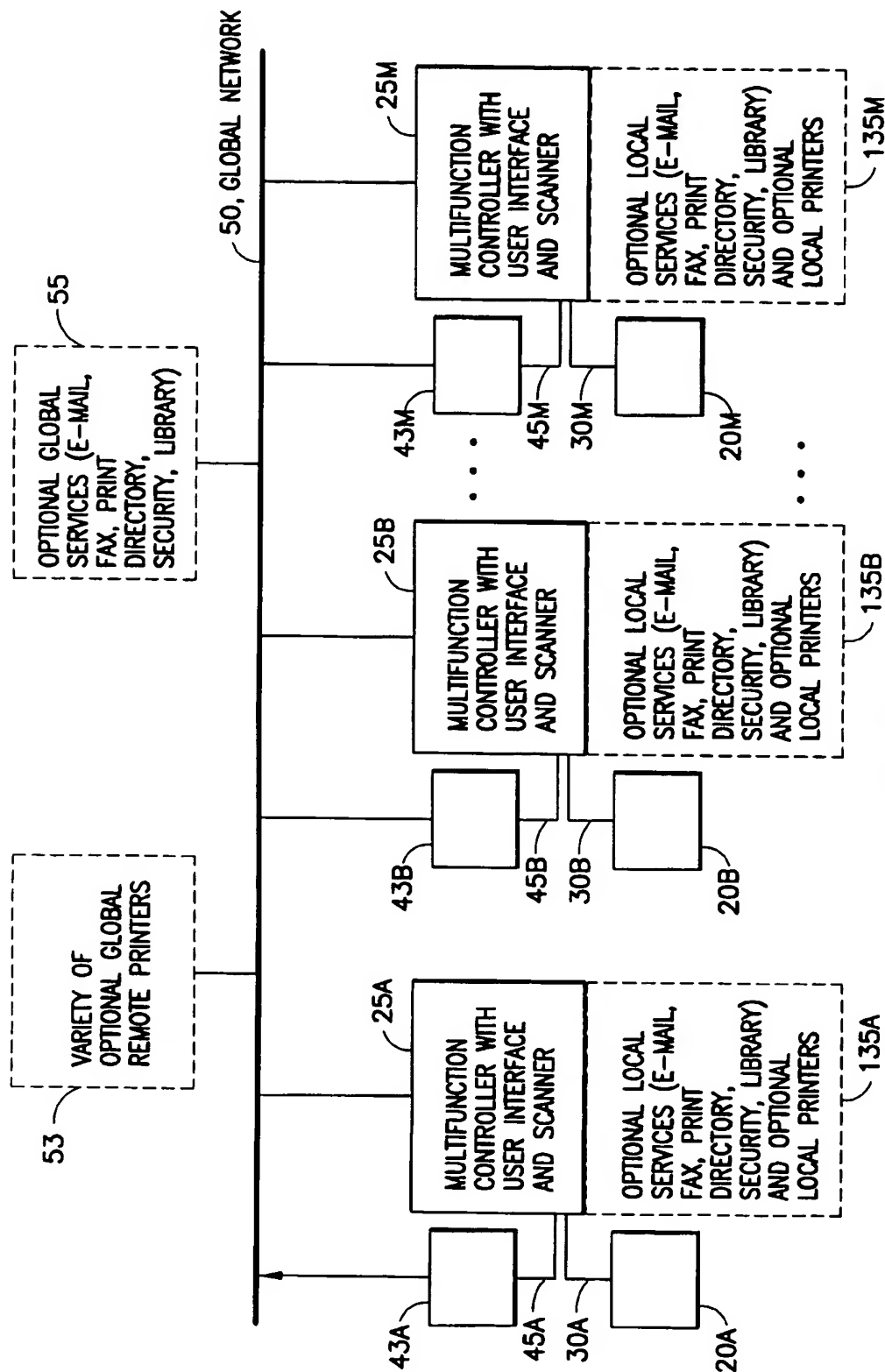


FIG. 3

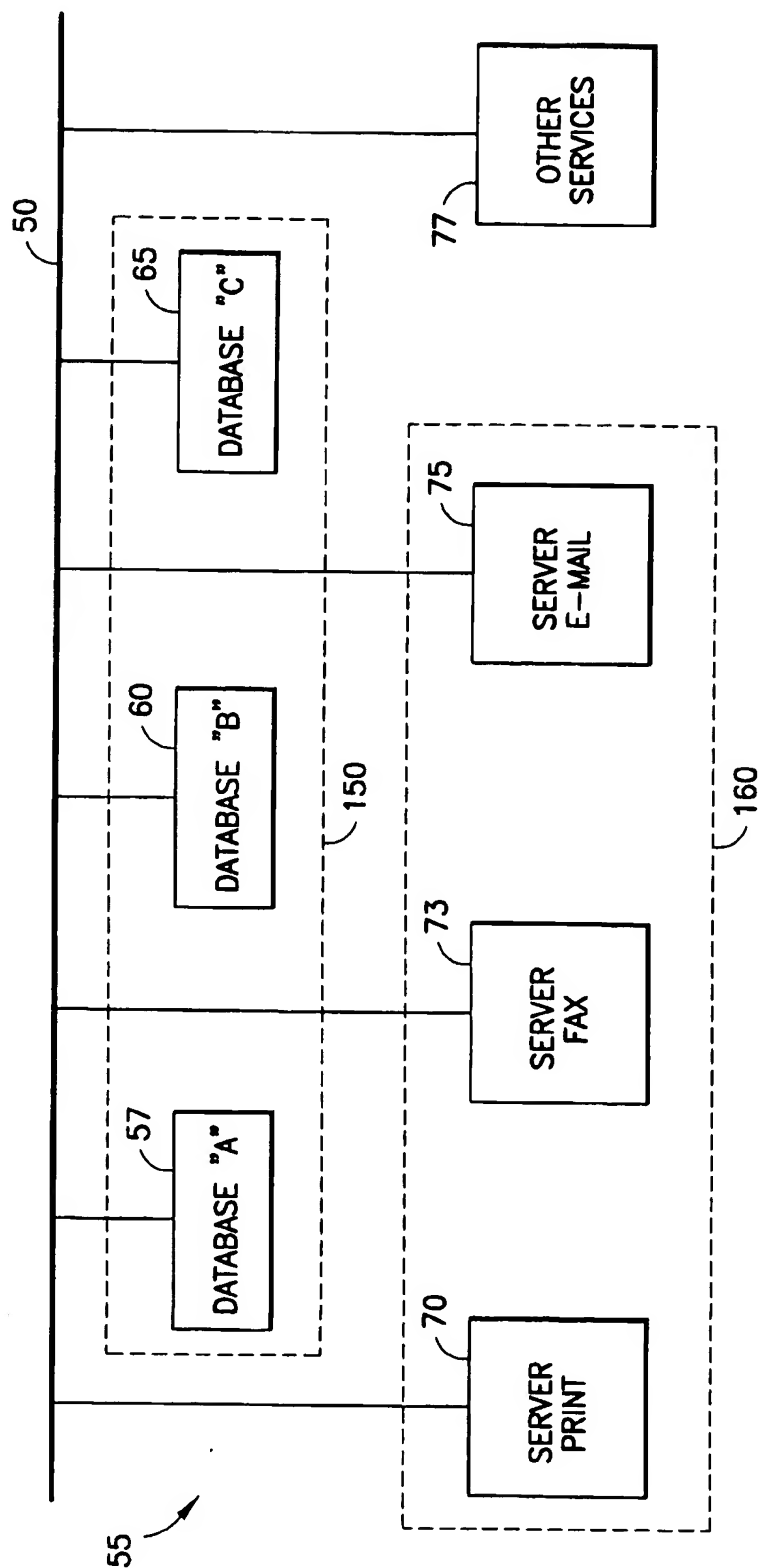


FIG. 4

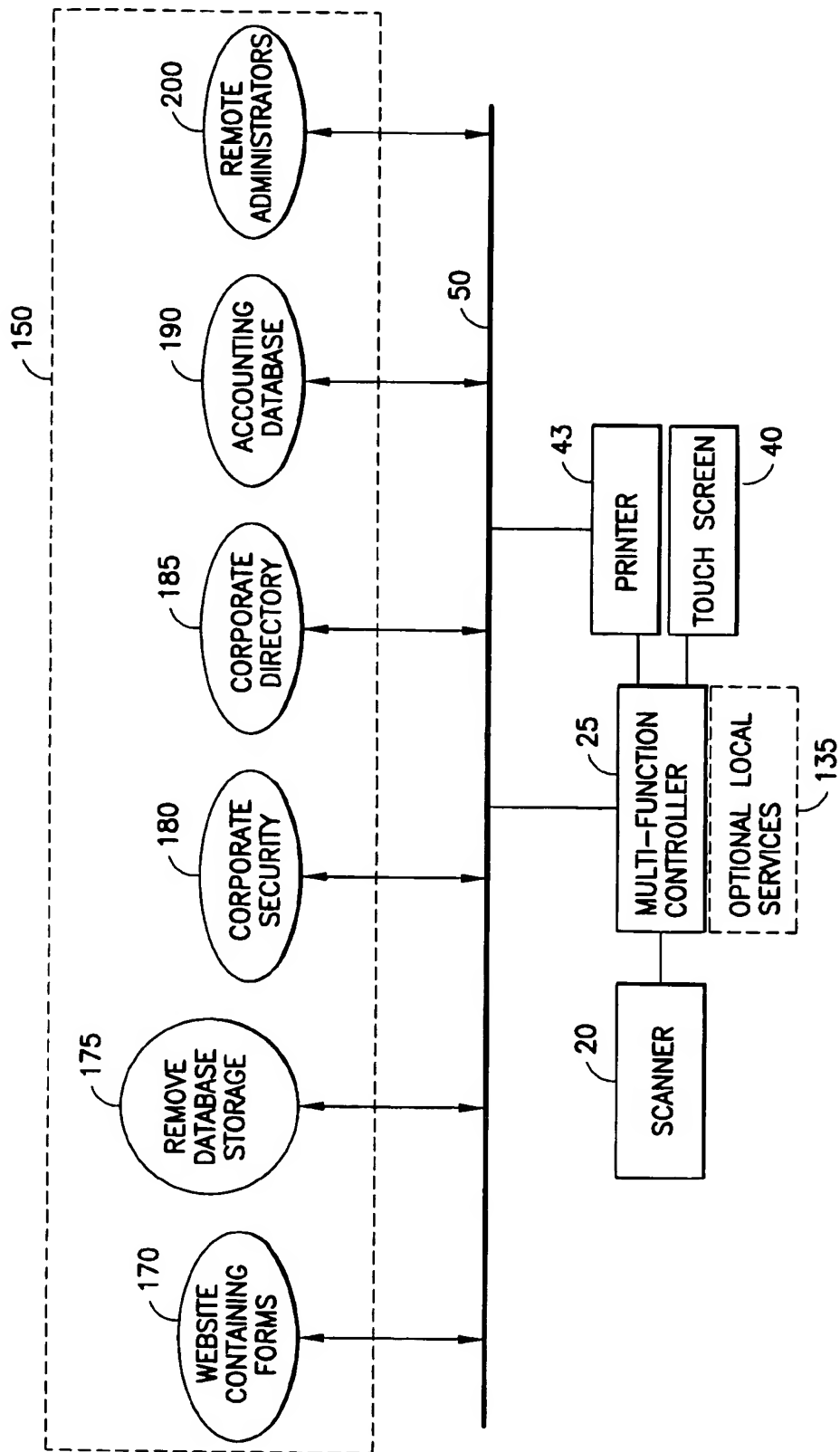


FIG. 5

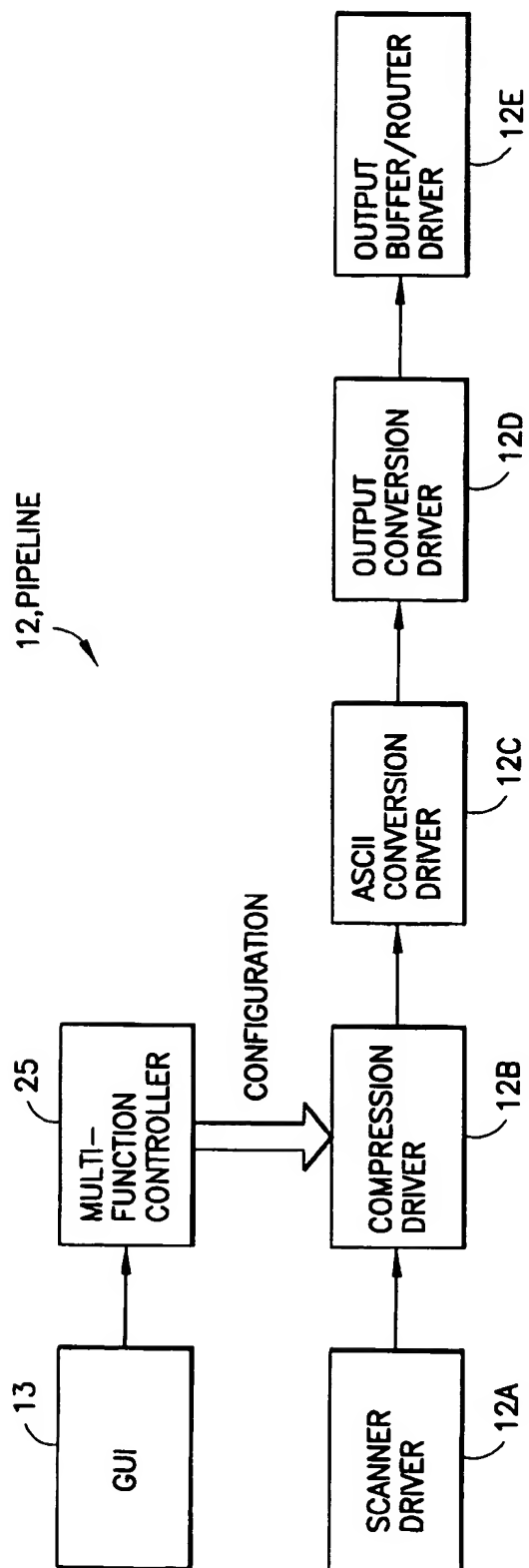


FIG. 6

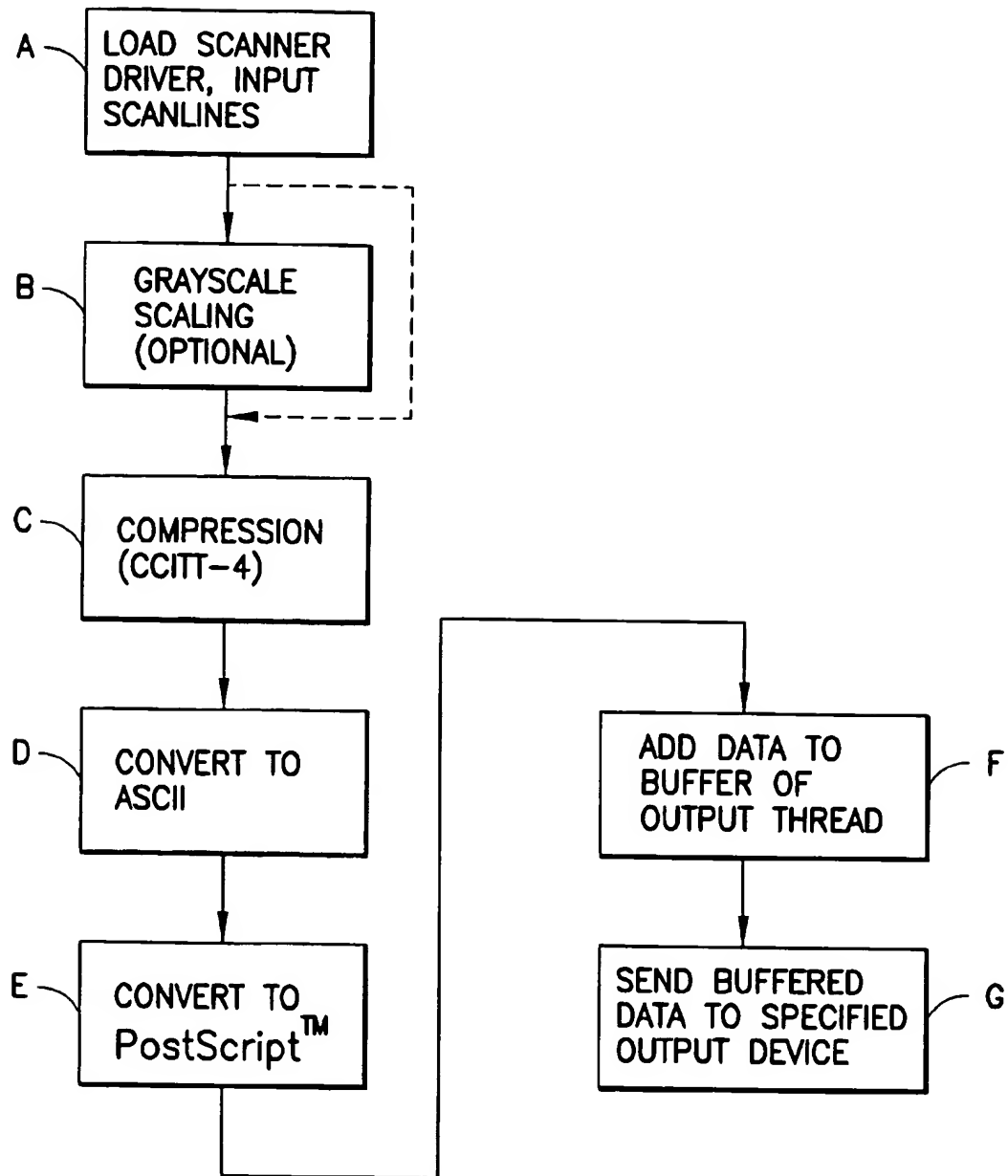
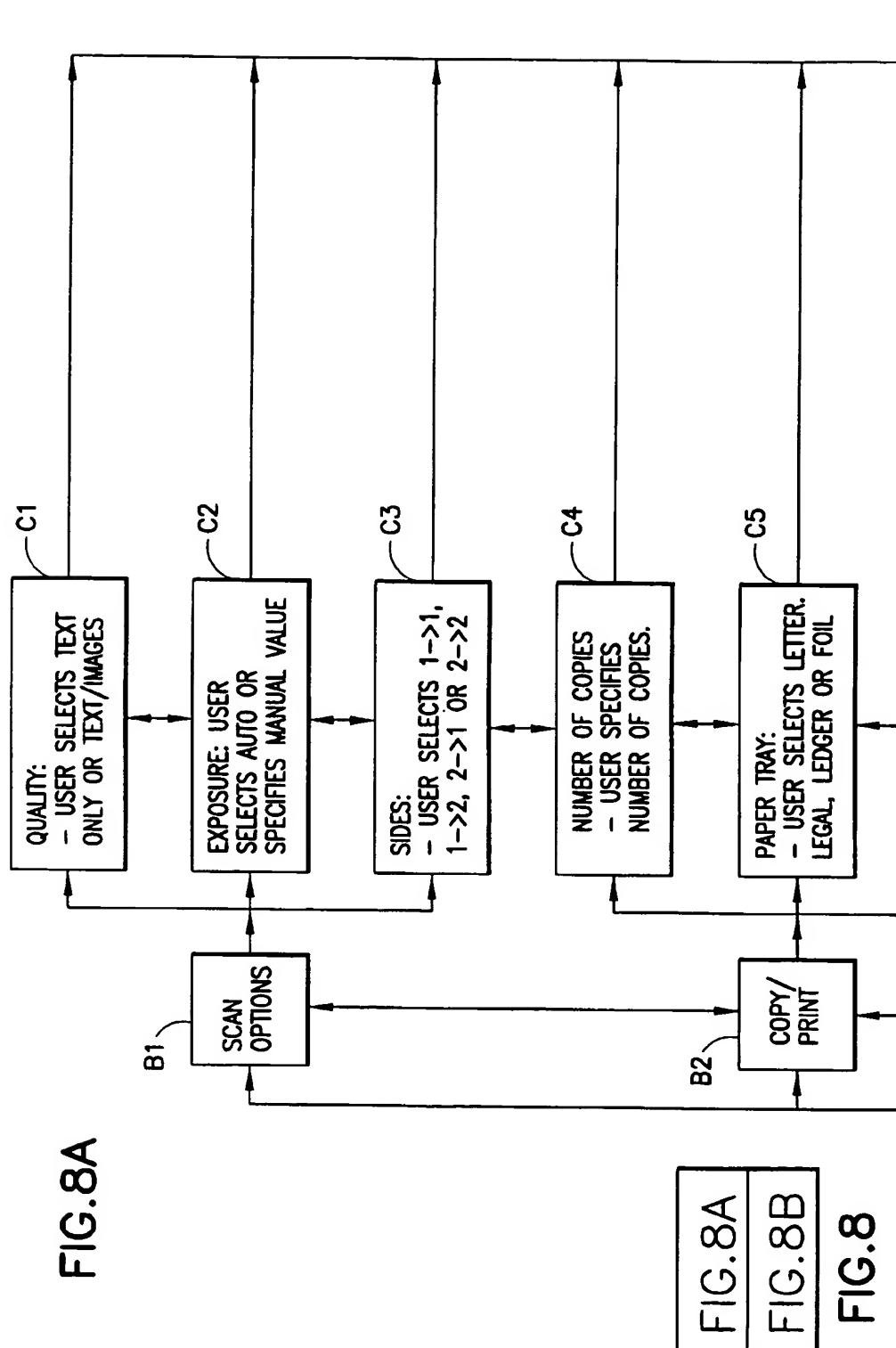
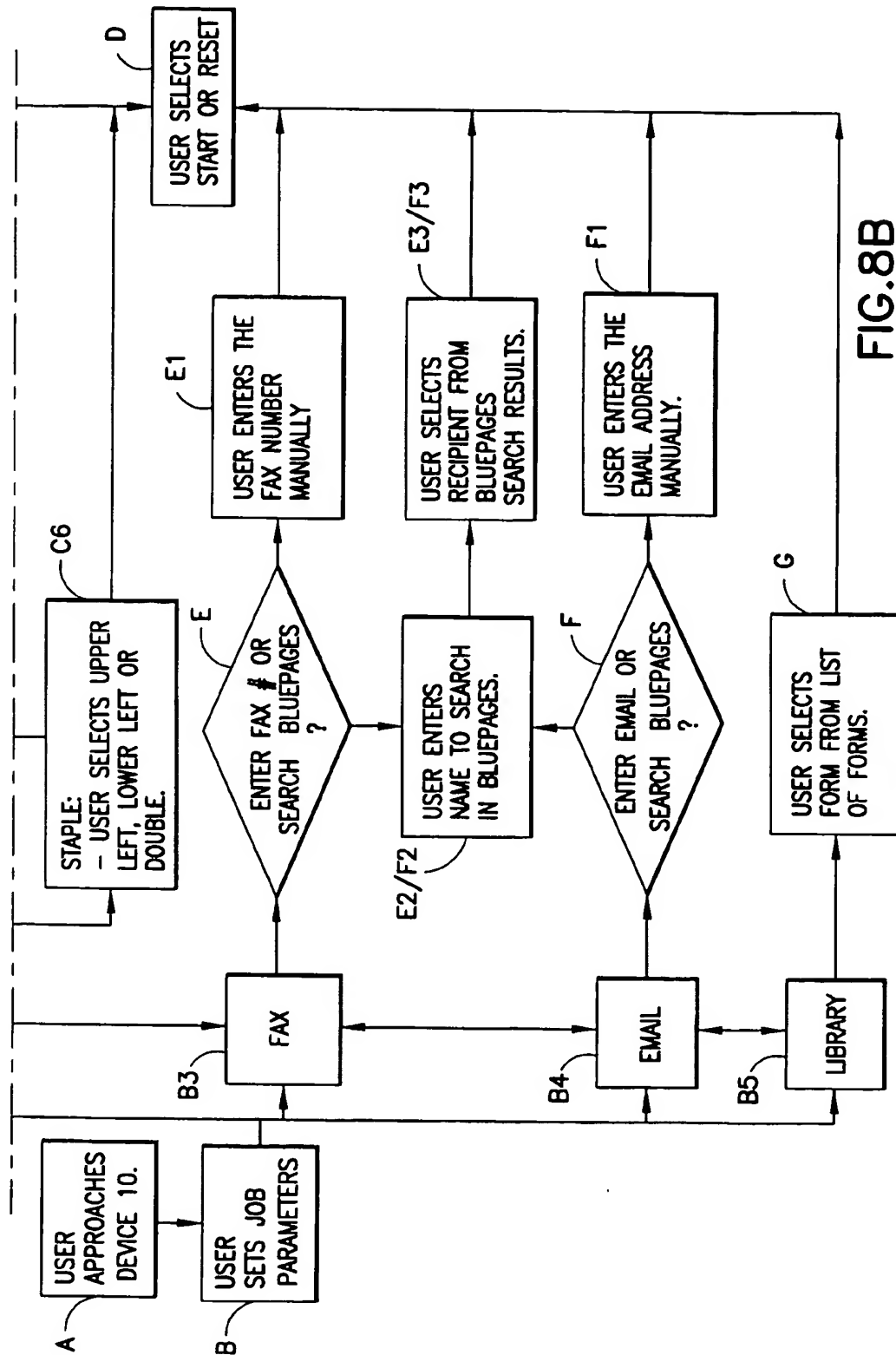


FIG. 7





Copy/Print Fax Email Library

Copy/Print

Copies 1

1 2 3 4 5 6 7 8 9 C 0 ←

Scan Options:

Quality: Text Only, Text/Images

Exposure: Auto, Lighten, Darken

Sides: 1 → 1, 1 → 2, 2 → 1, 2 → 2

Tray: Letter, Legal, Ledger, Foil

Staple: None, Upper Left, Double Staple

Printer: B&W

You have selected to:

- ▶ Copy/Print
- Send a fax
- Send an Email
- Print a Form

Start

Reset

Please swipe badge

FIG. 9A

Copy/Print Fax Email Library

BluePages

Fax Number

Cover Sheet Confirmation Notification

1 2 3 4 5 6 7 8 9 C 0 ←

Scan Options:

Quality: Text Only, Text/Images

Exposure: Auto, Lighten, Darken

Sides: 1 → 1, 1 → 2, 2 → 1, 2 → 2

Reset

You have selected to:

- Copy/Print
- Send a fax
- Send an Email
- Print a Form

Start

Please swipe badge

FIG. 9B

Search Results: Select recipient from list 6-People Found

Name	Email Address	Fax Number
		Fax
		Fax
		Fax
		Fax
		Fax
		Fax

New Search Cancel

Send an Email
Print a Form

FIG. 9C

Copy/Print Fax Email Library

Enter email Address BluePages

Converts input into a document optimized for viewing and printing

Converts input into a document that can be imported into a word processor for editing

Format

PDF Text

Email Address

Email Note

Scan Options:

Quality

Text Only Text/Images

Exposure

Auto Lighten Darken

Sides

1 → 1 1 → 2 2 → 1 2 → 2

Please swipe badge

Start

Reset

You have selected to:

Copy/Print
Send a fax
Send an Email
Print a Form

FIG. 9D

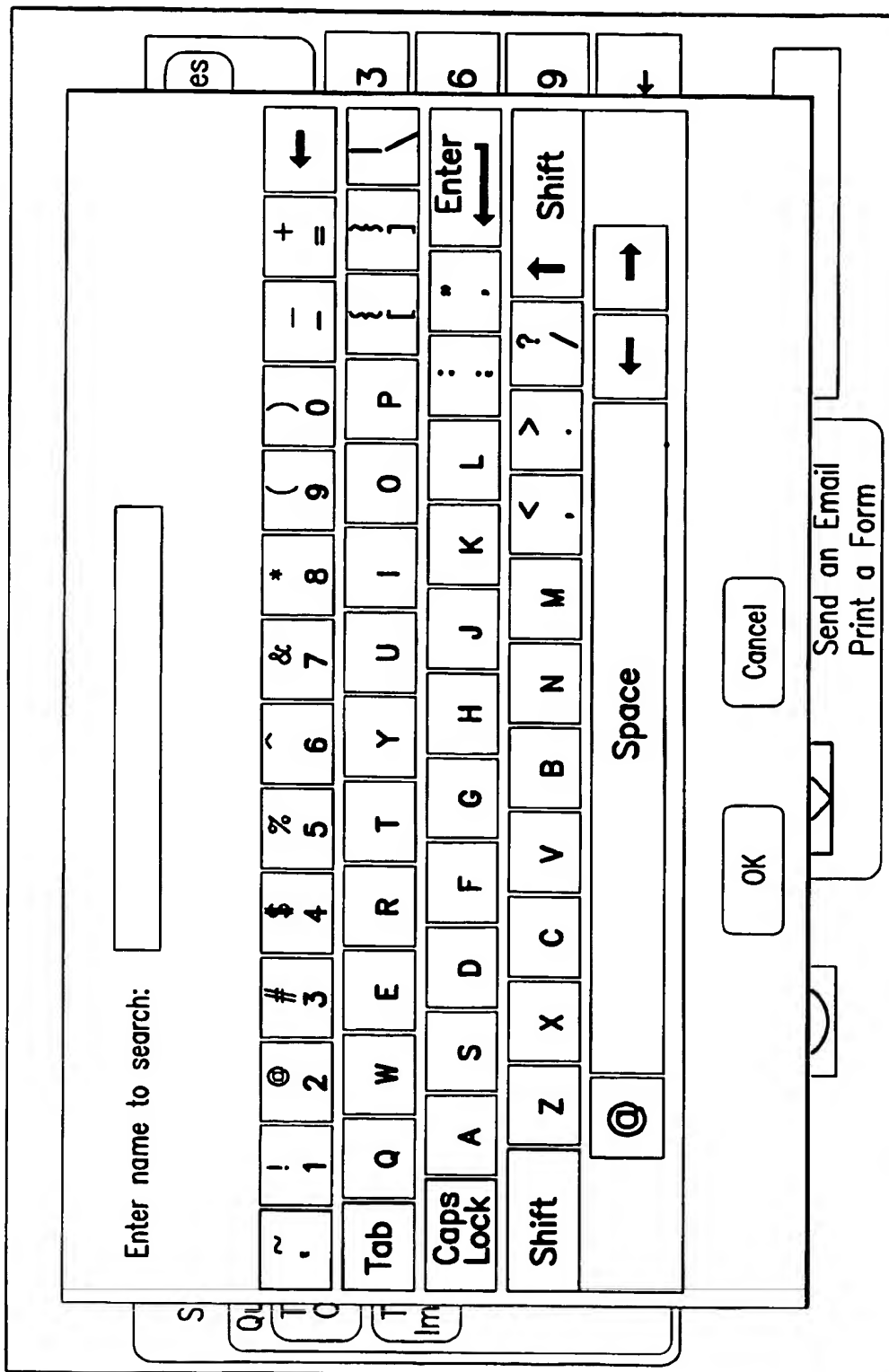


FIG. 9E

Copy/
Print

Fax

Email

Library

Scan Options:

Quality

Text Only

Text/Images

Exposure

Auto

Lighten

Darken

Sides

1→1

1→2

2→1

2→2

Description
Adoption Assistance Claim Form
Applicant Evaluation Form
Cooperative Education/Internship Student Performance Evaluation
Dental Plan Claim Form for 2000
Dental Plan Claim Form for 1999
Dependent Care Expense Verification

Start

Reset

You have selected to:

Copy/Print

Send a fax

Send an Email

Print a Form

Please swipe badge

FIG.9F

1

FULLY MODULAR MULTIFUNCTION DEVICE

FIELD OF THE INVENTION

This invention pertains to multifunction devices such as, but not limited to, devices that integrate facsimile, scanner, copier and printer functions, and more particularly this invention relates to improved architectures and user interfaces for multifunction devices.

BACKGROUND OF THE INVENTION

Traditional multifunction devices are monolithic, are based on proprietary device controllers, and have small touch screen user interfaces. Some of these devices are beginning to add e-business capabilities such as e-mail and directory, but their functionality is restricted by their monolithic architecture, their proprietary controllers, and their limited user interfaces.

Modular networked image processing systems are known in the art. Reference in this regard may be had to U.S. Pat. No. 5,530,907, entitled "Modular Networked Image Processing System and Method Thereof", issued Jun. 25, 1996, by K. Pavay and D. Feitelberg.

Reference can also be had to commonly assigned U.S. Pat. No. 4,454,575, entitled "Shared Memory System with Access by Specialized Peripherals Managed by Controller Initialized by Supervisory CPU", issued Jun. 12, 1984, whereby a document distribution center is organized to process data in specialized peripherals devices.

OBJECTS AND ADVANTAGES OF THE INVENTION

It is a first object and advantage of this invention to provide an improved architecture and user interface for a multifunction device.

It is another object and advantage of this invention to provide a multifunction device having a multifunction controller and a plurality interconnected drivers and components that can be added, deleted and upgraded as desired.

SUMMARY OF THE INVENTION

The foregoing and other problems are overcome and the objects of the invention are realized by methods and apparatus in accordance with embodiments of this invention.

The teachings herein pertain to a multifunction device that includes a scanner, a printer, and a multifunction controller with a touch screen graphical user interface (GUI). The multifunction device supports scanning, printing, copying, sending and receiving facsimiles (faxes) and sending and receiving e-mails. In accordance with an aspect of these teachings, network connections are made between the printer and the multifunction controller. In addition, the scanner is also a modular device, and preferably uses a standardized (non-proprietary) personal computer (PC) interface, such as a SCSI interface. This arrangement enables the multifunction controller to work with a variety of printers and a variety of scanners, while maintaining the appearance of an integrated device. The teachings herein also provide for integrating in a modular way with directory, library, e-mail, e-fax and e-form middleware, as well as print management middleware, also referred to as print servers, to significantly extend the capabilities of the multifunction device.

The modularity of the multifunction device provides a number of advantages, in that the device is more affordable,

2

has greater investment protection, is scalable, and has greater reach and availability.

One important aspect of these teachings is that by connecting the multifunction device to modular middleware services, such as external databases and services available over a network, the capabilities of the multifunction device are significantly extended, while at the same time delivering the desired additional capabilities with a simple interface.

Another feature of these teachings is the general purpose controller and the full size touch screen. That is, the multifunction controller is preferably implemented as a general purpose system, such as a PC or a workstation, while the related GUI is implemented as a full size touch screen. The general purpose multifunction controller enables modularity and middleware integration, while the full size touch screen enables a wider range of capabilities to be realized in the multifunction device than is possible with a traditional multifunction devices, without requiring the operator to have an specific computer skills.

The teachings found herein provide a cost effective multifunction device, as the multifunction controller and the scanner can be added to existing printers to create the multifunction device. The multifunction device is also more scalable than traditional multifunction devices. For example, when the capabilities of a first printer and/or scanner are outgrown, these components can be upgraded to higher capacity and higher performance devices. The multifunction device is also more scalable in that it can connect a plurality of scanners to one printer, or one scanner to a plurality of printers, or a plurality of scanners to a plurality of printers.

The teachings found herein also provide investment protection for the purchaser by allowing more advanced printers or scanners to replace older technology, without replacing the entire multifunction device. The multifunction device also has a greater reach than traditional multifunction devices, at least for the reason that the scanner can be remote from the printer, and exhibits greater availability since a backup printer can be selected if a local printer is out of service, and the multifunction device can thus continue to be used. The multifunction device is also more competitive than traditional devices, as it allows the best scanners and printers to be selected on their own merit, rather than being tied together in a monolithic device.

Integration with network-based services, such as a directory database, simplifies the identification of people and resources at the multifunction device, while integration with a document library database enables convenient access for the storage and retrieval of documents. In addition, integration of the multifunction device with electronic mail (e-mail) provides the flexibility to deliver information instantly and with greater reach than can be achieved with paper copies alone.

In a preferred embodiment the scanner component or components are coupled directly to a single, dedicated multifunction controller to allow rapid conversion of scanned documents to a desired printer format (e.g., a Postscript™ format) through a dedicated pipeline processor.

The multifunction controller may access a set of global services, such as forms, employee profiles, a fax server, an e-mail server, over a data communications network (such the Internet or a LAN), or it may incorporate these services locally. A plurality of multifunction controllers can be coupled together through a data network, and may share resources between themselves, including both global resources and local resources.

Forms accessed from a forms database are converted from their native format, for example, from a .pdf format, to a printer format (e.g., Postscript™) by the pipeline processor.

3

4

The multifunction controller also allows the modular replacement of printers and scanners, and also enables a user to send the same document to a number of printers, fax numbers, and e-mail addresses. The multifunction controller provides a user with an ability to request printing, to hold a document for later access, as well as to redirect a document to a desired printer or other output device.

The teachings herein also pertain to a multifunction copier device, which includes such functions as faxing, e-mailing, copying, and data storage/retrieval.

The teachings herein also provide an ability to dynamically and bidirectionally integrate remote datastores or databases, and provide access to the information locally or remotely. These teachings also support the exchange of information so that the multifunction device can retrieve information from, and insert information into, remote datastores. The datastore connection is preferably made through common networking interfaces, such as a global data communications network (the Internet is one example), and/or through a local area network (LAN).

The teachings herein provide a "kiosk"-type workflow and interface into remote datastores, allowing easy walkup access to complex tasks using a variety of remote datastores, such as corporate records databases and corporate forms databases.

By deploying a multifunction device with an internal set of functions, including as fax, copy and e-mail, these teachings provide access to data in conjunction with an ability for an operator to use all of the functions in the multifunction device. For example, the operator can retrieve a document or a form from a local or a remote datastore, and then fax, e-mail, copy and/or print the document on the multifunction device.

This information link is dynamic, that is, remote databases can be queried immediately or periodically, ensuring that all information presented to the user is the most current available, while also providing flexibility to ensure efficiency on the data communications network.

By integrating this level of connectivity into a multifunction device, the users need not be concerned with maintaining the latest information, as the latest versions of documents, forms and the like are always available and accessible. Furthermore, paper document storage is decreased, since the latest documents of an organization can be accessed and processed through the multifunction device on demand. Not only can these documents be printed, but other document handling functions of the multifunction device can be utilized, such as faxing and e-mailing.

In addition, the multifunction device can access remote datastores to obtain user-specific information, such as user profile and user security information, and can then utilize this user-specific information with various functions of the system, including keystroke saving functions, limitation of access rights, and accounting information.

The multifunction device may be considered as a configurable kiosk-like multifunction device that provides connectivity, preferably with a touch screen GUI, to many facets of an organization's infrastructure, thereby reducing costs and increasing productivity.

A multifunction device in accordance with the teachings of this invention includes a multifunction controller, a first interface for receiving input data from at least one scanner and a second interface for outputting processed input data to at least one printer, wherein the first interface and the second interface are each comprised of a standard interface, and further including a graphical user interface for controlling

the operation of the multifunction device, including setting operational parameters for the at least one scanner and the at least one printer. In a presently preferred embodiment the first interface is comprised of a SCSI interface.

Other interfaces are also provided, including one for coupling to a facsimile device for outputting processed input data to the facsimile device, and another interface for coupling to an e-mail port for outputting processed input data to the e-mail port.

Another interface is for coupling to a global data communications network, such as the Internet, for receiving document data as well as recipient contact information therefrom.

BRIEF DESCRIPTION OF THE DRAWINGS

The above set forth and other features of the invention are made more apparent in the ensuing Detailed Description of the Invention when read in conjunction with the attached Drawings, wherein:

FIG. 1 is simplified block diagram of the multifunction device in accordance with the teachings herein, the multifunction device including a multifunction controller that is coupled to other components via local and global data communications networks;

FIG. 2 is a block diagram that illustrates the multifunction controller of FIG. 1 in greater detail;

FIG. 3 is a block diagram that illustrates a plurality of multifunction controllers networked together into a distributed system of multifunction devices;

FIG. 4 is a block diagram that depicts a plurality of optional global services in greater detail, where the optional global services can be segregated by function, for example as databases, servers and other services;

FIG. 5 illustrates exemplary databases that are part of the optional global services of FIG. 4, the databases including, for example, a website containing standard forms, a remote storage database, a corporate security database, a corporate directory, an accounting database, and a remote administration database;

FIG. 6 depicts an example of a document processing pipeline that is implemented as a set of software drivers that are invoked based on user input through the Graphical User Interface (GUI);

FIG. 7 is a logic flow diagram illustrating an operation of the exemplary document processing pipeline of FIG. 6;

FIG. 8 is a logic flow diagram that is exemplary of the overall user control of the multifunction device, via the Graphical User Interface (GUI); and

FIGS. 9A-9F are examples of screens displayed to a user of the multifunction device using the GUI.

DETAILED DESCRIPTION OF THE INVENTION

The disclosure of the above-mentioned commonly assigned U.S. Pat. No. 4,454,575, entitled "Shared Memory System with Access by Specialized Peripherals Managed by Controller Initialized by Supervisory CPU", issued Jun. 12, 1984, is incorporated by reference herein in its entirety.

FIG. 1 is a block diagram of a presently preferred embodiment of a multifunction device 10 in accordance with the teachings found herein. At least one scanner 20 is coupled to a multifunction controller 25 through a link 30, which is preferably a standard link, such as a SCSI interface. The multifunction controller 25 is coupled to a touch screen 40,

5

which provides a Graphical User Interface (GUI) 13, and to an optional speaker 47 which can provide preprogrammed or synthesized audio responses to a user. An optional microphone (not shown) can also be included for providing voice recognition, voice commands and voice prompts, via a suitable voice recognition function. The multifunction controller 25 is further optionally coupled to at least one printer 43 through a link 45, which is preferably a dedicated local network type interface. The printer 43 can be coupled separately to a global network 50 so that it can be accessed from other document sources, such as another multifunction controller 25 (see, for example, FIG. 3). The multifunction controller 25 is also coupled to the global network 50 and is thus capable of utilizing other optional global remote printers 53 on the global network 50. The multifunction controller 25 is thus also capable of communicating with, and utilizing, various optional global services 55 over the global network 50. The optional global services 55 can include, but are not limited to, e-mail, facsimile (fax), printer, directory, security and library services and datastores. The multifunction controller 25 is not limited to utilizing optional global services 55 on the global network 50, but also has the capability of implementing all or some of these services as optional, local services 135 at the controller 25. The optional global services 55 and the optional local services 135 are explained in greater detail below.

An optional user recognition device 26, such as a retinal scanner, fingerprint recognizer, badge scanner or card reader can be provided as well.

It should be appreciated that a primary function of the multifunction device 10 lies in the generation, inputting, processing, transformation, printing, reproduction, duplication and export of document data, wherein document data is assumed, for the purposes herein, to include textual information expressed in any language or character set, as well as graphical information, such as mathematical symbols, as well as image information, such as scanned or electronically generated photographs, and any combination of textual, graphical and image information.

The scanner 20 and printer 43 may be any commercially available devices using industry standard interfaces for communication to the controller 25. This provides an advantage in that the controller 25 may be integrated with scanning and printing devices already in place. An additional advantage is that, as the scanner 20 or printer 43 reaches the end of its useful life, or additional features become available, the scanner 20 or printer 43 may be replaced, without replacing other components of the overall system that comprises the multifunction device 10.

As was mentioned above, the link 30 between the scanner 20 and the multifunction controller 25 is preferably an industry standard interface, such as a SCSI interface. It should be noted, however, that the link 30 and its interface is not limited to being a SCSI interface, but may be any interface suitable for communication between the multifunction controller 25 and the scanner 20.

Similarly, while the link 45 between the printer 43 and the multifunction controller 25 was described as a dedicated network type interface, the interface 45 is not limited to being a dedicated network interface, but may include any interface suitable for communication between the multifunction controller 25 and the printer 43.

The global network 50 can be any suitable network for linking the multifunction controller 25 to the optional remote printer 53 and to the optional global services 55. Global network 50 may include as a portion thereof one or

6

more local area networks (LANs), a wide area network (WAN), an intranet and/or the Internet. It can be appreciated that the network 50 may be "global" in the sense that it reaches throughout the infrastructure of a particular organization, such as a corporation or a governmental department or agency, but it may not be directly accessible from outside of the organization.

The controller 25 is shown in more detail in FIG. 2. The controller 25 includes a CPU 80, a random access memory (RAM) 85 for temporary storage of data, and a read only memory (ROM) 90 for permanent storage of data, which can include instructions for implementing a controller operating system 95, as well as a document processing pipeline program 100. In another, more preferred embodiment these programs are resident on one or more disk drives, and then loaded into RAM 85 prior to execution. The controller 25 also includes a touch screen interface 105 coupled to the touch screen 40. The touch screen 40 provides the Graphical User interface (GUI) 13 to the user of the multifunction system 10.

The controller 25 communicates with the scanner 20 (FIG. 1) through a scanner interface 120 (such as a SCSI interface), communicates with the printer 43 (FIG. 1) through a printer interface 125, and communicates with the global network 50 through a global network interface 130. The controller 25 may also include the optional local services 135.

It should be understood that the controller 25 may be constructed along the lines of a standard computer or workstation architecture, and may include multiple data processors, and may execute an industry standard operating system, for example, Windows™, Windows NT™, OS/2™, or Linux™.

As is shown in FIG. 3, it should also be understood that a plurality of controllers 25A . . . 25n may be networked together, that is, operate together on the global network 50 as a single system within a single organization. The networked multifunction controllers 25A-25n may further communicate and share resources, for example, global remote printers 53, local scanners 20A-20n, local printers 43A-43n, optional global services 55, and optional local services 135A-135n. The optional global resources 55 include databases, servers, and other such services generally available through the network 50. In this case the various multifunction controllers 25A-25n and other network-connected devices are assumed to have unique network addresses so that messages and data can be routed to them as needed.

FIG. 4 shows the optional global services 55 in greater detail. The optional global services may be segregated by functions, for example databases 150, servers 160, and other services 77. Databases A, B, and C (57, 60, and 65, respectively) may respectively store information regarding, for example, user profiles, user identification and forms, that is, copies of commonly used documents in electronic format. Servers 70, 73, and 75 may include, for example, a print server 70, a fax server 73 and an e-mail server 75. Having the optional global services 55 available on the global network 50 is advantageous in that all multifunction controllers 25 have access to the global services 55, regardless of location. Another advantage is that the centralized services may be upgraded in a modular fashion as they reach the end of their useful life, or as new features become available. The databases 150 serve as a single focal point of organization information, which simplifies changes and updates.

It should be understood that while the optional global resources 55 are shown in the context of a series of discrete services connected by global network 50, that they are not limited to a discrete, network-based implementation. The optional global services 55 may be incorporated in the multifunction controller 25 as the optional local services 135, and may remain accessible by other controllers on the global network 50. For the case where the optional local services, 135 include a fax capability, the optional local services 135 may include a connection to a telephone network 140, as shown in FIG. 2.

In accordance with one mode of operation, the user operates the multifunction device 10 by scanning a document using the scanner 20, or by retrieving a document from one of the optional global services 55 or the optional local services 135. The user then selects a destination, or destinations, for the document. Destinations may include local printers 43, network printers 53, fax machines 135, or Internet addresses, including e-mail addresses. After the destination(s) have been selected, the user operates the multifunction device 10 to send the document to the selected destination(s). It is important to note that the user has the ability to send a document to any number of destinations. That is, a single document may be sent to several printers, fax machines, and/or e-mail addresses if desired.

In the environment where a plurality of multifunction controllers 25 are networked together, as in FIG. 3, the multifunction device 10 can provide a capability for the user to select as a destination, for example, the printer 43n connected to another controller 25n, and to then instruct the system to hold the document, that is, to refrain from printing it, until the user requests that the document be printed. After selecting a destination, and instructing the system to hold the document, the network of multifunction devices 10 operates to further allow the user to identify himself/herself to another multifunction device on the network, which then polls the other multifunction devices 10 to locate the document being held for the identified user, and to then allow the user to redirect the held document to a printer 43 of the user's choice.

In accordance with a further aspect of these teachings, and referring to FIG. 6, a document processing pipeline 12 is implemented as a set of software drivers that are invoked based on user input through the Graphical User Interface (GUI) 13. As was discussed above, the GUI 13 is preferably implemented using the touch screen display 40.

Referring to FIG. 6, the user first indicates, using the GUI 13, a desired document processing mode of operation to the multifunction device 10. This input causes the multifunction device 10 to select and interconnect a set of drivers for transforming document data from scanline information on one end to the appropriate digital representation on the other end.

Briefly stated, in one embodiment the pipeline 12 includes a driver 12A for the scanner 20 that connects to a driver 12B that compresses the scanner data. The compressed data is then provided to a driver 12C that converts the compressed data to an ASCII-representable set of codes, followed by a driver 12D that creates a Level 3 Postscript™ representation for the output device, such as one of the local printers 43 or global printers 53. The data is next fed to a final driver 12E that buffers the data while it simultaneously sends the data to whatever address, such as a printer address or an Internet address, that was specified.

An important aspect of the document processing pipeline 12 is its ability to transform scanline data into a standard

format, which in the preferred implementation is the PostScript™ format. If the user desires to connect a different scanner 20 at one end of the pipeline 12, then the pipeline 12 begins with the appropriate driver for that scanner. Likewise, at the output end, if a different printer 43 or 53 is chosen, then the Postscript™ driver is adapted for the desired printer. If the end device is unknown, then no unique codes need be written to the datastream for the unknown output device (such as codes for stapling options, duplexing, output bins, etc.) However, generic printer codes can be included in the output datastream.

The output device does not have to be a printer. For example, in some cases the data is transformed into a .pdf format which is sent as e-mail. As such, the final section of the pipeline 12 could be a file driver or a socket connection.

The document processing pipeline 12 can thus be envisioned as a set of interchangeable stages or steps, with some being optional, that are comprised of code, with each sharing a common interface with other steps or pieces of code. When linked in the correct order the steps of the pipeline 12 connect the input, e.g., the scanner 20, to the output, e.g., the printer 43, and cause a number of events to occur to the data along the way that result in the desired output that the user of the multifunction device 10 requires.

In general, the pipeline 12 receives scanline data from the scanner 20 and outputs the scanline data line by line to the output device, such as the printer 43. In this manner the entire page is not required to be first assembled before initiating the printing process.

FIG. 7 and the following description present an example of the pipeline 12 and how it may be configured in accordance with a presently preferred system implementation. These steps should not be construed as the only manner in which the pipeline 12 can be configured. For example, certain pipeline stages can be connected to other pipeline stages, and other drivers not expressly listed could be inserted into the pipeline 12 to elicit new behavior and functionality.

Step A: A driver sets up the scanner 20 for scanning, and loads a driver defined by the scanner manufacturer to control the scanner 20. The scanner driver connects to Steps B or C, depending on input from the user.

Step B is used when operating in an image quality mode. This driver takes grayscale data and scales it for printing, while transforming the data into binary data. This step need only be invoked if the user selects an image quality mode of operation. The data output by Step B is provided to Step C for compression.

Step C can vary depending on the type of compression that is required. A presently preferred embodiment employs a CCITT Group 4 compression for binary data. Step C changes when color is used, as CCITT Group 4 compression only supports binary data. However, some type of compression step is preferably included in the pipeline 12 to enhance the efficiency of data transfer to the output device.

Step D converts the compressed data into an ASCII code representable data. For example, the data is transformed into ASCII Hex encoded data, or into ASCII 85 encoded data. Both are well defined standards.

Step E converts the incoming ASCII data into Adobe PostScript™ data. This step need be invoked only if the user intends to send the data to a printer 43, 53 at the end of the pipeline. At this step or stage all of the device-dependant information is added to the data passing through the pipeline 12 for defining the output to a known output device (e.g., a printer). If the current printer is unknown to the system, then

it may attempt to use generic PostScript™ information to achieve the results that the user has requested.

Step F takes the input data from Step E and adds it to the buffer of a thread that is communicating with the desired output device. The data can be added to a linked list of buffer data contained within the thread for shipment to the output device.

In Step G the data in the buffer list of the communications thread is packaged and shipped to the desired output device, such as a printer 43 or an e-mail application. This step waits on the output device to be available to accept the data in its buffer.

The foregoing has been but one example of the steps that are taken to transform the incoming scan line data into outgoing raster data. The pipeline 12 is preferably constructed on a per job basis, where the user defines what stages need to be in the pipeline 12, and the system, actually the multifunction controller 25, then connects those stages to provide the user with the desired output.

FIG. 5 shows one example of the databases 150 that form a part of the optional global services 55. The databases 150 include, in an example wherein an organization is a corporation, a website containing standard forms 170, a remote storage database 175, a corporate security database 180, a corporate directory 185, an accounting database 190, and a remote administration database 200. Access between the databases 150 and the controller 25 is bi-directional through the global data communications network 50 so that the multifunction controller 25 can both retrieve information from and insert information into the remote databases 150.

The website containing standard forms 170 allows users to access standard forms that an enterprise might use, for example, requisitions, health forms, expense reports, etc. The remote database storage 175 may include any database information that may be useful to users, for example, archived documents, statistical databases for various types of analyses, etc. The corporate security database 180 provides the system with user identification data to verify the identity and access privileges of a particular user. The information can include a particular user's employee number, databases that the user is authorized to access, etc. The corporate directory database 185 can include user profiles, for example, a user's contact information, telephone number, fax number and e-mail address may be stored in the corporate directory database 185. A user may also store a particular fax cover sheet, or cover sheet information in the corporate directory database 185 for automatic retrieval by the controller 25. Upon proper identification of a user, verified by the corporate security database 180, the corporate directory database 185 may pass greeting information to the controller 25 where it may be displayed on the touch screen 40 (FIG. 1) or played as an audio greeting through the speaker 47 (FIG. 1).

The accounting database 190 provides for cost tracking. For example, the multifunction controller 25 may report each time a fax is sent, a page is printed, etc. for allocating the costs of resources among various entities. These reports can thus be accumulated in the accounting database 190.

The multifunction controller 25 also has the ability to accept downloads of various characteristics of the databases 150, for providing an efficient use of the global network 50. For example, the corporate directory database 185 may generate an index on a periodic basis and download the index to the multifunction controller 25, thereby allowing the multifunction controller 25 to quickly determine the location of corporate directory information for a particular

user. Index generation may be initiated by either a particular one of the databases 150, or by the multifunction controller 25 itself on a periodic basis. The multifunction controller 25 may also query and download databases or portions of databases immediately or periodically, ensuring that all information presented to the user is the most currently available, while also providing flexibility to ensure efficiency on the network 50 and devices attached to the network 50. These downloads, depending on the nature of the downloaded data and the typical frequency that the data is revised or updated, can occur on an hourly basis, or a daily basis, or a weekly basis, etc.

The remote administrator's database 200 controls the index generation, query cycles, and other types of database administration functions, including access by the multifunction controller 25. For example, it may be desirable for the multifunction controller 25 to have access to only a subset of the databases 150 that are provided as part of the global optional services 55. This limited access is controlled by the remote administrator's database 200.

Using the multifunction device 10 with an internal set of functions, such as fax, copy and e-mail, the teachings herein provide access to data and provide a user with an ability to use all available functions from the touch screen display 40. For example, the user can retrieve a document from a remote data store 150 and fax, e-mail or print it on a selected device. This information link is dynamic.

By thus integrating this level of connectivity into the multifunction device 10, a user no longer need be concerned with maintaining a copy of the latest organization information, as access to the most recent information can be readily provided. In addition, paper document storage requirements are decreased since the latest organization documents can be accessed and processed through the multifunction device 10 on demand. Not only can these documents be printed, but the other functions of the multifunction device 10 can be utilized to fax the documents, e-mail the documents, and otherwise process these documents. The connectivity via security database 180 also enables access to the remote data stores 150 to obtain user information that can be utilized with the various functions of the system, including keystroke saving functions, limitation of access rights, and accounting information. The multifunction device 10 can be envisioned as a configurable kiosk-like multifunction device that provides connectivity to many facets of an organization's infrastructure, allowing costs to be reduced while productivity is increased.

Examples of the use of the multifunction system 10 in a corporate environment include the following. Assume that a corporation's human resource documents are stored on a website, and also assume that administrative assistants keep copies of these forms in filing cabinets, so that they can be quickly retrieved. Using the multifunction system 10 one can access the website and have the latest, most up-to-date versions of these documents printed, faxed or e-mailed on demand. The user can select the quantity to be printed or copied, and uses the walkup kiosk-like GUI 13, much as an office worker would use a conventional document copier. The multifunction device 10 may also check the website periodically ensure that it has a current list of documents. Then, when a document is chosen, that document is dynamically downloaded each time it is requested, ensuring that only up-to-date documents are utilized. This avoids the problem that arises when paper copies of certain forms are kept in a filing cabinet, and are not replaced when a particular form is deleted, depleted, revised, or superseded by another form.

As another example, assume that a company wishes to enable secure printing. Through the network connectivity of the multifunction device 10, documents can be accepted from remote users. Then, when the user is at a local device, they can identify themselves to the system via a secure method, such as badge swiping or fingerprint or retinal scanning. The user identification information is then checked against a corporate database to ensure access privileges, such as the corporate security database 180 of FIG. 5. The validated user is then provided access to all documents waiting for him or her, and can print, fax, and/or e-mail from the multifunction device 10. Once the user is identified to the multifunction device 10, the user's name and other employee or personal information can be appended to any outgoing documents automatically, such as e-mail and faxes, freeing the user from the time wasting effort of typing in this information manually, or manually creating items such as fax cover pages.

Assume further that a given company wishes to replace its fax machines, and has a large corporate directory stored in a database and website. The teachings herein provide the ability to connect to the corporate directory and make it accessible to the multifunction device 10. The user can then employ the touch screen interface 40 to locate another user by their partially entered name. The interface 10 then displays the recipient's e-mail and fax information so that the user can select between faxing or e-mailing the document to the recipient.

FIG. 8 is a logic flow diagram that is exemplary of the overall user control of the multifunction device 10, via the Graphical User Interface (GUI) 13. At Step A the user approaches the multifunction device 10 and at Step B the user set the parameters for a particular job. The Step B entails selecting and setting parameters for one or a plurality of job types. The job types or options that can be selected using the GUI 13 include, but need not be limited to, a scan option (B1), a copy/printing option (B2), a fax option (B3), an e-mail option (B4) and a library function option (B5). It should be apparent from the arrows running vertically between the job options B1-B5 that more than one can be selected. For example, the user can select job option B1 to scan a document, as well as options B2-B4 to print, fax and then e-mail the scanned document, respectively. Alternatively, the user could select job option B5 to access a particular form, as well as job option B2 to print the selected form.

When selecting job options B1 and B2 the user is further enabled to set a number of job parameters (or the user may simply use default parameters). The user-settable job parameters include, but need not be limited to, quality, e.g. text or image/text (C1), exposure (C2), number of sides (C3), number of copies (C4), paper tray, e.g., letter/legal (C5), and staple options (C6). Note that while job parameters C1-C3 are more specific to the document scan job option B1, all of the job parameters C1-C6 can apply to the print/copy job option B2. While not specifically indicated in FIG. 8, the various scan options can preferably be set at anytime, such as when setting copy, fax, e-mail and library options.

After selecting none, one, some or all of the job parameters C1-C6 control passes to Step D, where the user presses either a Start key on the touch screen GUI 13 to start the selected job, or the user presses a Reset key on the touch screen GUI 13 to cancel the selected job and to reset any changed job parameters to their default values. The system also automatically resets after a predetermined timeout period (e.g., one minute).

If the user selects the fax job option B3 control passes to Step E where the user manually enters, using an on-screen

keyboard/keypad, the recipient's fax number (Step E1), or where the user searches the local fax number book or directory database 135, or the appropriate global database 150, by entering at least a partial name or other information for locating and selecting the intended fax recipient (Steps E2 and E3). Control then passes to Step D to Start the fax job, or to cancel (Reset) the fax job.

If the user selects the e-mail job option B4 control passes to Step F where the user manually enters the recipient's email address (Step F1), or where the user searches the local e-mail address book or directory database 135, or the appropriate global database 150, by entering at least a partial name or other information for locating and selecting the intended e-mail recipient (Steps F2 and F3). Note that the same directory or other database may have both the fax number and the e-mail address for various potential recipients, and that these need not be stored in separate databases. For example, all contact information for a particular potential recipient, including voice phone number, fax number, cellular phone number, e-mail address, mail station and the like can be stored in one database entry. In any event, control then passes to Step D to Start the e-mail job, or to cancel the e-mail job.

It should be remembered that a document can be sent to multiple output locations, such as a plurality of facsimile and/or e-mail recipients.

If the user selects the library job option B5 control passes to Step G where the user selects a form from the list of forms maintained either by the local forms database 135, or from the appropriate global database 150, such as the website containing forms 170. Control then passes to Step D to possibly print the selected form.

Reference can be had to FIGS. 9A-9F for examples of screens displayed to a user of the multifunction device 10 using the GUI 13. Note in FIGS. 9A, 9B, 9D and 9F the Scan Options portion as described above in conjunction with FIG. 8, whereby the quality, exposure and number of sides can be selected. Note as well in FIG. 9A that a first Tab has been selected (Copy/Print). The above-mentioned Copy/Print options are also displayed (tray, staple, printer (B&W)). The desired number of copies can be entered, and then the Start button depressed (or the Reset button).

It should be noted that it is not necessary to completely finish specifying all Copy/Print options (or all scanner options for that matter) before pressing a Tab key to, for example, specify the Fax or Email mode.

In FIG. 9B a second Tab has been selected (Fax). At this time the user is enabled to enter the recipient's fax number using the numeric keypad, and to select cover sheet options. If the "BluePages" button is selected instead, the keyboard screen of FIG. 9E can be displayed, whereby the user is enabled enter all or a portion of a name, followed by depressing the OK button. A search is then conducted in, for example, the Directory database 185, and in FIG. 9C a list of possible matching names and fax numbers is displayed (as well as e-mail addresses if available). The user can scroll through the list until a desired fax number is found, which can then be selected by pressing the associated Fax button.

In FIG. 9D a third Tab has been selected (Email). At this time the user can enter the recipient's e-mail address (if known), after pressing the Enter Email Address button, using the alphanumeric keyboard screen shown in FIG. 9E. To facilitate the entry of the e-mail address a "@" key is provided, as most touch screens do not support the simultaneous depression of two "keys", or Shift and "2" in this case. If the e-mail address is not known, then the "BlueP-

13

ages" button can be selected instead, the keyboard screen of FIG. 9E is displayed, and the user is enabled enter all or a portion of the name, followed by depressing the OK button. The search is then made in the Directory database 185, and in FIG. 9C the list of possible matching names and e-mail addresses is displayed. The user can scroll through the list until a desired e-mail address is found. The e-mail can be sent in one of two user-selectable formats (PDF or Text), and is transmitted when the Start button is pressed by the user.

In FIG. 9F a fourth Tab has been selected (Library). In response, the multifunction controller 25 accesses the remote website containing forms 170 (or accesses the local forms database if available) and displays the current forms index. The user is enabled to scroll through the displayed forms index until a desired form is located, which can then be selected by touching the form name. The Copy/Print Tab button can then be touched to print or copy the form is desired, or the form could be faxed or e-mailed to a desired recipient or recipients, as described above.

Although described above in the context of specific document functions, input/output devices, system architectures and the like, those skilled in the art should appreciate that these are exemplary and indicative of presently preferred embodiments of these teachings, and are not intended to be read or construed in a limiting sense upon these teachings.

Thus, while the invention has been particularly shown and described with respect to preferred embodiments thereof, it will be understood by those skilled in the art that changes in form and details may be made therein without departing from the scope and spirit of the invention.

What is claimed is:

1. A multifunction device, comprising:
 - a multifunction controller;
 - a first interface which receives input data from at least one scanner and a second interface which outputs processed input data to at least one printer, wherein said first interface and said second interface are each comprised of a standard interface;
 - a third interface which couples to an email port which outputs processed input data to said email port;
 - a fourth interface which couples to a global data communications network which receives document data as well as recipient contact information therefrom; and
 - a graphical user interface which controls the operation of said multifunction device, including setting operational parameters for said at least one scanner and said at least one printer.
2. A multifunction device as in claim 1, wherein said first interface is comprised of a SCSI interface.
3. A multifunction device as in claim 1, and further comprising another interface for coupling to a facsimile device for outputting processed input data to said facsimile device.
4. Apparatus comprising:
 - a scanner interface coupling at least one scanner and generating a digital record of a scanned image;
 - a printer interface coupling at least one printer and generating printed copy signals corresponding to the digital record, the printed copy signals being effective in printing at the printer an image derived from the scanned image;
 - a controller which couples said scanner interface and said printer interface, said controller having
 - a first network interface which connects to an area network for bidirectional exchange of digital data; and

14

- a second network interface which connects to a second network for bidirectional exchange of digital data;
 - a control program stored accessibly to and executable on said controller, said control program when executing effective in setting operational parameters for the scanner and the printer and enabling a user to select delivery of the digital record to a selected one of said printer interface, said first network interface, and said second network interface; and
 - a memory coupled to and housed with said controller; said control program when executing on said controller further enabling a user to store a database of address information in said memory and enabling access to said database of address information stored in said memory.
5. Apparatus according to claim 4 wherein said control program when executing on said controller further enabling a user to selectively access one of said database of address information stored in said memory and a second database of address information stored remotely from said controller and accessible through said first network interface.
 6. Apparatus comprising:
 - a scanner interface coupling at least one scanner and generating a digital record of a scanned image;
 - a printer interface coupling at least one printer and generating printed copy signals corresponding to the digital record, the printed copy signals being effective in printing at the printer an image derived from the scanned image;
 - a controller which couples said scanner interface and said printer interface, said controller having
 - a first network interface which connects to an area network for bidirectional exchange of digital data; and
 - a second network interface which connects to a second network for bidirectional exchange of digital data;
 - a control program stored accessibly to and executable on said controller, said control program when executing effective in setting operational parameters for the scanner and the printer and enabling a user to select delivery of the digital record to any selected two of said printer interface, said first network interface, and said second network interface; and
 - a memory coupled to and housed with said controller; said control program when executing on said controller further enabling a user to store a database of address information in said memory and enabling access to said database of address information stored in said memory.
 7. Apparatus according to claim 6 wherein said control program when executing on said controller further enabling a user to selectively access one of said database of address information stored in said memory and a second database of address information stored remotely from said controller and accessible through said first network interface.
 8. Apparatus comprising:
 - a scanner interface coupling at least one scanner and generating a digital record of a scanned image;
 - a printer interface coupling at least one printer and generating printed copy signals corresponding to the digital record, the printed copy signals being effective in printing at the printer an image derived from the scanned image;
 - a controller which couples said scanner interface and said printer interface, said controller having
 - a first network interface which connects to an area network for bidirectional exchange of digital data; and

15

a second network interface which connects to a second network for bidirectional exchange of digital data;

a control program stored accessibly to and executable on said controller, said control program when executing effective in setting operational parameters for the scanner and the printer and enabling a user to select delivery of the digital record each and all of said printer interface, said first network interface, and said second network interface; and

a memory coupled to and housed with said controller; said control program when executing on said controller further enabling a user to store a database of address information in said memory and enabling access to said database of address information stored in said memory.

9. Apparatus according to claim 8 wherein said control program when executing on said controller further enabling a user to selectively access one of said database of address information stored in said memory and a second database of address information stored remotely from said controller and accessible through said first network interface.

10. Apparatus comprising:

an image capture device which generates a digital record;

a printer which generates a printed copy derived from the digital record;

a controller which couples said image capture device and said printer, said controller having

a first network interface which connects to an area network for bidirectional exchange of digital data; and

a second network interface which connects to a second network for exchange of digital data; and

a control program stored accessibly to and executable on said controller, said control program when executing effective in setting operational parameters for the image capture device and the printer and enabling a user to select delivery of the digital record to a selected one of said printer, said first network interface to generate an electronic mail message, and said second network interface to generate a facsimile transmission to a remote facsimile receiver;

wherein said printer is remote to said controller and is coupled to said controller via said first network interface.

11. Apparatus according to claim 10 wherein said control program when executing on said controller enables a user to access a remotely stored database of address information.

12. Apparatus according to claim 10 further comprising:

a memory coupled to and housed with said controller; said control program when executing on said controller further enabling a user to store a database of address information in said memory and enabling access to said database of address information stored in said memory.

13. Apparatus according to claim 10 further comprising:

a memory coupled to and housed with said controller; said control program when executing on said controller further enabling a user to store a database of address information in said memory and to selectively access one of said database of address information stored in said memory and a second database of address information stored remotely from said controller and accessible through said first network interface.

14. Apparatus comprising:

an image capture device which generates a digital record;

a printer which generates a printed copy derived from the digital record;

16

a controller which couples said image capture device and said printer, said controller having

a first network interface which connects to an area network for bidirectional exchange of digital data; and

a second network interface which connects to a second network for exchange of digital data; and

a control program stored accessibly to and executable on said controller, said control program when executing effective in setting operational parameters for the image capture device and the printer and enabling a user to select delivery of the digital record to any selected two of said printer, said first network interface to generate an electronic mail message, and said second network interface to generate a facsimile transmission to a remote facsimile receiver;

wherein said printer is remote to said controller and is coupled to said controller via said first network interface.

15. Apparatus according to claim 14 wherein said control program when executing on said controller enables a user to access a remotely stored database of address information.

16. Apparatus according to claim 14 further comprising:

a memory coupled to and housed with said controller; said control program when executing on said controller further enabling a user to store a database of address information in said memory and enabling access to said database of address information stored in said memory.

17. Apparatus according to claim 14 further comprising:

a memory coupled to and housed with said controller; said control program when executing on said controller further enabling a user to store a database of address information in said memory and to selectively access one of said database of address information stored in said memory and a second database of address information stored remotely from said controller and accessible through said first network interface.

18. Apparatus comprising:

an image capture device which generates a digital record;

a printer which generates a printed copy derived from the digital record;

a controller which couples said image capture device and said printer, said controller having

a first network interface which connects to an area network for bidirectional exchange of digital data; and

a second network interface which connects to a second network for exchange of digital data; and

a control program stored accessibly to and executable on said controller, said control program when executing effective in setting operational parameters for the image capture device and the printer and enabling a user to select delivery of the digital record to each and all of said printer, said first network interface to generate an electronic mail message, and said second network interface to generate a facsimile transmission to a remote facsimile receiver;

wherein said printer is remote to said controller and is coupled to said controller via said first network interface.

19. Apparatus according to claim 18 wherein said control program when executing on said controller enables a user to access a remotely stored database of address information.

20. Apparatus according to claim 18 further comprising:

a memory coupled to and housed with said controller;

17

said control program when executing on said controller further enabling a user to store a database of address information in said memory and enabling access to said database of address information stored in said memory.

21. Apparatus according to claim 18 further comprising a memory coupled to and housed with said controller; said control program when executing on said controller further enabling a user to store a database of address information in said memory and to selectively access one of said database of address information stored in said memory and a second database of address information stored remotely from said controller and accessible through said first network interface.

22. A method comprising the steps of:

capturing, on an associated image capture device, a digital record of a document;

executing on a controller a control program which sets operational parameters for the associated image capture device and enables a user to select delivery of the captured digital record to one of an associated printer, a first network interface, and a second network interface; and

performing in accordance to such selection one of:

a. setting operational parameters for the associated printer and delivering the digital record to the associated printer to generate a copy of the document;

b. delivering the digital record to the first network interface to generate an electronic mail message;

c. delivering the digital record to the second network interface to generate a facsimile transmission to a remote facsimile receiver.

23. The method of claim 22 wherein the format of the electronic mail message is a format selected from the group consisting of PDF and Text.

24. A method comprising the steps of:

capturing, on an associated image capture device, a digital record of a document;

executing on a controller a control program which sets operational parameters for the associated image capture device and enables a user to select delivery of the captured digital record to one of an associated printer, a first network interface, and a second network interface; and

performing in accordance to such selection at least two of:

i. setting operational parameters for the associated printer and delivering the digital record to the associated printer to generate a copy of the document;

18

ii. delivering the digital record to the first network interface to generate an electronic mail message;

iii. delivering the digital record to the second network interface to generate a facsimile transmission to a remote facsimile receiver.

25. The method of claim 24 wherein the format of the electronic mail message is a format selected from the group consisting of PDF and Text.

26. A program product comprising:

a computer readable medium;

a control program stored on said medium, said control program when executing on a controller which couples an image capture device, a printer, and first and second network interfaces, setting operational parameters for the image capture device and enabling a user to select delivery of a digital record captured by the device to one of the printer, the first network interface, and the second network interface by performing in accordance to such selection one of:

(a) setting operational parameters for the printer and delivering the digital record to the printer to generate a copy of the document;

(b) delivering the digital record to the first network interface to generate an electronic mail message;

(c) delivering the digital record to the second network interface to generate a facsimile transmission to a remote facsimile receiver.

27. A program product comprising:

a computer readable medium;

a control program stored on said medium, said control program when executing on a controller which couples an image capture device, a printer, and first and second network interfaces, setting operational parameters for the image capture device and enabling a user to select delivery of a digital record captured by the device to one of the printer, the first network interface, and the second network interface by performing in accordance to such selection one of:

(a) setting operational parameters for the printer and delivering the digital record to the printer to generate a copy of the document;

(b) delivering the digital record to the first network interface to generate an electronic mail message;

(c) delivering the digital record to the second network interface to generate a facsimile transmission to a remote facsimile receiver.

* * * * *